ANTHRONOTES®

MUSEUM OF NATURAL HISTORY PUBLICATION FOR EDUCATORS

VOLUME 30 NO. 2 FALL 2009

TOWARDS A GREENER FUTURE:

ARCHAEOLOGY AND CONTEMPORARY ENVIRONMENTAL ISSUES

by Torben C. Rick

❖ ❖ ❖

The secret is out! Archaeologists have something to say about contemporary environmental issues and the sustainability of our planet Earth. This is not surprising to archaeologists who have long known the importance of deep time perspectives for shedding light on issues ranging from the beginnings of plant and animal domestication and agriculture to the origin of states and political hierarchy. Archaeologists and anthropologists working from an ecological perspective also have helped illuminate the eternal questions: Who are we? Where did we come from? Why do we exist?

Yet archaeological contributions to contemporary environmental issues are far from mainstream. Archaeologists continue to fight an uphill battle to get environmental archaeology recognized by ecologists, biologists, resource managers, and especially the general public.

The tide, fortunately, is turning. There are new collaborative studies between archaeologists and ecologists; ecologists increasingly recognize the value of long-term historical perspectives in their own work; and collaborative environmental funding initiatives from the National Science Foundation and other agencies are growing in number. Today we find archaeologists' publications appearing in ecological or interdisciplinary scientific journals. Such publications provide important deep time context for current environmental issues such as global warming.

30th Anniversary Issue

The public and probably K-12 students and teachers have yet to fully appreciate archaeology's ever-increasing relevance to understanding modern day environmental problems. Jared Diamond's successful book *Collapse* (2005) helped increase knowledge about archaeological data and its relevance to understanding ancient human environmental relationships.

But for many the relevant questions are not yet completely clear. Can archaeologists provide cautionary tales about the environmental mistakes of ancient peoples? Can they generate information on sustainable ways of living in the past that may help us transcend current problems? Can archeologists provide the context for how environments function over centuries, millennia, or more, which can help us project into the future? The answer is yes, all of the above and more (Costanza et al. 2007; Redman 1999; Rogers 2004).

Three case studies—the Hawaiian Islands, France's Rhône Valley, and California's Channel Islands—illustrate archaeology's many contributions to understanding the range of ancient human environmental interactions.

Hawai'i: A Human Modified Paradise?

Anyone who has been to the Hawaiian Islands can attest to their incredible natural beauty and their remarkable Polynesian cultural heritage. Some of the most compre-

hensive studies of ancient human environmental interactions come from Hawai'i and other Pacific Islands.

Once these islands were viewed as a paradise free from human intervention but research over the last several decades has shown that ancient maritime agriculturalists actively modified and degraded Pacific Island land and seascapes (Kirch 2004, 2007). Pat Kirch, a leading Pacific Island archaeologist, and his interdisciplinary team have gathered archaeological and ancient environmental data that improves our understanding of past and present Hawaiian environments, shedding light on how best to manage Hawaiian ecosystems into the future (Kirch 2004, 2007). Kirch and his team have used Hawai'i as a model system for understanding human ecological dynamics. This model demonstrates the interplay of climatic events, human agricultural activities, and landscape transformation in shaping both the social and natural worlds.

Though the initial date of human colonization of Hawai'i is still under investigation, Polynesians probably arrived around A.D. 800. At that time, they likely found a tropical island archipelago populated with forests and birds that had evolved in the absence of humans and other common predators. Driven by an expanding population of ancient Hawaiians totaling as many as 400,000 people, Hawaiian agricultural and other human activities had a variety of impacts on island landscapes, plants, and animals (Kirch 2007). Human hunting and landscape clearing, for example, caused the extinction of some terrestrial birds. Sediment cores document dramatic alteration of Hawaiian island vegetation communities over the last 1000 years, including widespread burning that resulted in human modified landscapes largely used for agriculture (Kirch 2007: 15).

Intensification of agricultural systems over several centuries, including the use of irrigation, continued to modify and transform the Hawaiian Islands. These changes placed increased pressure on the landscape and influenced sociopolitical developments including the formation of Hawaiian polities. The rise of some Hawaiian island chiefs, for instance, correlated with environmental variables, with some leaders seeking to increase agriculture and other resources to offset famines and other downturns (Kirch 2007: 22).

Ancient dryland agricultural field system with embankments as visible from the cinder cone of Pu'u Kehena in Kohala district, Hawai'i (Photo by Patrick Kirch).

Rat remains in Hawai'i and elsewhere in the Pacific Islands help tell us that not all human environmental impacts are intentional or direct. Rats, after all, probably were unintentionally introduced as stowaways on ancient Polynesian canoes. On Hawai'i and other islands, rats likely were responsible for the extinction of some bird species by causing a decline in dry-land forests through consumption of massive quantities of seeds, fruits, and seedlings, and also by preying on eggs and young birds.

The Hawaiian data illustrate important lessons for today. First, humans have profoundly influenced Hawaiian ecosystems for centuries or even longer. Any attempt to understand Hawaiian ecosystems must take

this into account. Recent environmental patterns in Hawai'i are very different from those in deeper time, reflected in an archaeological record ripe with examples of extinction and landscape alteration.

Another lesson comes from the perils of unchecked population growth that resulted in famine, environmental degradation, and concomitant social and political changes—difficult issues that are relevant but rarely addressed in today's densely populated world (Kirch 2004).

Roman Land Degradation: Southeastern France

If you travel to the Rhône Valley located in French wine country, you will find an area that has sustained human occupation for millennia. Not surprisingly, you also will find an important archaeological record of human interactions with local ecosystems. This record has illuminated long-term patterns of landscape degradation analyzed by Sander van der Leeuw and his colleagues in the ARCHAEOMEDES project (van der Leeuw 2000; van der Leeuw et al. 2004).

One of the most dynamic and complicated periods of Rhône Valley history was the Roman period. Spanning some six centuries—from 50 B.C. to the sixth century A.D.—the Rhône Valley was brought into the broader globalized economies of Europe, Asia, and Africa that transformed the landscape in new and unique ways (van der Leeuw et al. 2004: 115).

To evaluate the effects of Roman settlement and agrarian systems in the Rhône Valley, van der Leeuw and his colleagues evaluated scores of archaeological sites, soil profiles, Roman maps and other historical documents, along with climate records over a roughly 10,000-year period. The team focused in part on the lessons ancient soils can tell us about the environmental productivity of certain landscapes, their suitability for agriculture, the history of erosion and other causes of landscape degradation, and ultimately how such factors affected human settlement and abandonment.

Initial Roman settlement in the Rhône Valley was rapid. It involved expansion into some of the most desirable settings, followed by a contraction that appeared to have balanced out the number of people in the valley (van der Leeuw et al. 2004). The Romans brought with them an economy and agricultural system focused on grapes, olives, and wheat. They relied on crops that would be economically lucrative, investing heavily in the clearing, draining, and irrigation of areas that had thus far been viewed as marginal. Wine production was particularly intense, comparable to the agribusiness of the 19th and 20th centuries (van der Leeuw et al. 2004:122).

A period of contraction and famine during the second and third centuries A.D. resulted in a social crisis, largely because the Roman system of agriculture was fragile and only viable during periods when climatic conditions were favorable (van der Leeuw et al. 2004). Heavier rainfall than expected caused widespread erosion and system disruption, part of a complex interplay of human-induced degradation, climate change, and political factors in an increasingly globalized market system. Roman activities and land use pushed the environmental and social system close to its limits of productivity. In the Roman agricultural system, the landscape was dependent on human intervention to function properly. This undermined the system's resiliency and its ability to adapt in the face of widespread change (van der Leeuw 2000; van der Leeuw et al. 2004).

Like the Hawaiian case study, the ARCHAEOMEDES project demonstrates that environmental variables cannot be viewed separately from social and political developments since these and other factors are intricately intertwined. Moreover, these analyses suggest that today's Rhône Valley ecosystems are the result of long-term human settlement and climatic characteristics. To effectively understand these ecosystems, they must be viewed on millennial as well as shorter time scales of a few decades or less.

California's Oceans

Devastated by overfishing, nutrient enrichment, pollution, climate change, and other factors, our oceans are in a state of crisis with many ecosystems and fisheries at or near collapse. The impending threats to earth's oceans and an increasing awareness of the antiquity of human exploitation of coastal areas have prompted archaeologists to explore long-term human exploitation of marine ecosystems

Elephant seals on the beach adjacent to a badly eroding site on San Miguel Island, California. Sites in the area have produced few to no elephant seal bones over the last 10,000 years. However, they are the most abundant animal on the island today. Photo courtesy Torben Rick

and the ways in which these studies can help inform present day issues.

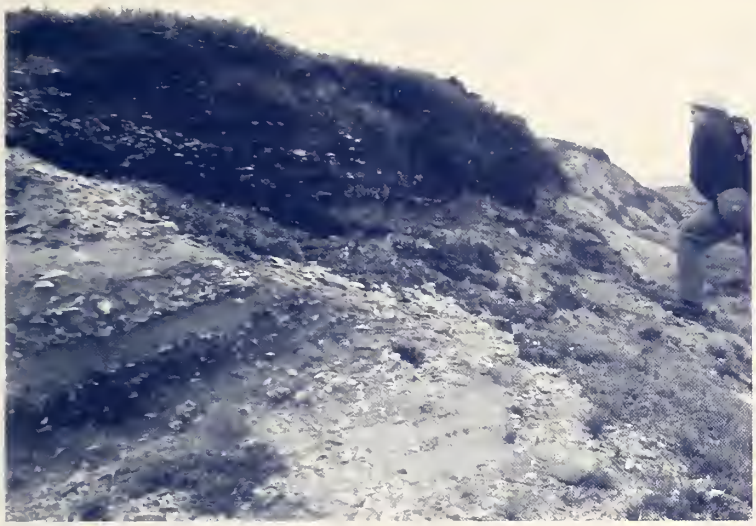
In California, I have worked with an interdisciplinary team investigating a continuous archaeological record of human exploitation of marine ecosystems on the Channel Islands spanning some 10,000 years (Braje 2009; Erlandson and Rick 2010; Rick and Erlandson 2008). Our research demonstrates that the Channel Islands' land and seascapes have been actively shaped by the islands' ancient hunter-gatherers. These men and women harvested a variety of marine and terrestrial resources and engaged in a sophisticated exchange system with the coastal mainland.

One of the hallmarks of California's Channel Islands today is the presence of over 150,000 seals and sea lions from six different species. These sea mammals breed and haul out (rest on the shore) in one of the largest colonies south of Alaska. Today, northern elephant seals and California sea lions, followed by northern fur seals, are the most abundant and conspicuous seals and sea lions on the islands with smaller numbers of harbor seals. Guadalupe fur seals are rarely seen. In contrast, the archaeological record suggests that seal and sea lion populations were comparatively limited for much of the last 10,000 years while Guadalupe fur seals were the most common species with elephant seal remains rarely identified (Erlandson and Rick 2010; Rick and Erlandson 2008).

These differences are clearly apparent at Point Bennett on San Miguel Island. In this area tens of thousands of California sea lions, elephant seals, and northern fur seals come to breed every year. Some 400 years ago, however, there was a large Native American village site in the middle of these contemporary breeding grounds. This site contains visible house features, abundant artifacts, and faunal remains dominated by marine fishes with smaller amounts of seals and sea lions. The presence of this village and other nearby sites of even greater antiquity suggests that the current breeding grounds at Point Bennett did not exist just a few centuries ago (Erlandson and Rick 2010).

The disconnect between the ancient and modern abundance and distribution of seals and sea lions shows that ancient peoples strongly influenced prehistoric seal and sea lion biogeography and abundance. The modern sys-

Channel Islands artifacts: beads and microdrills (top); shell and bone fishhooks (middle); projectile points (bottom). Photo courtesy Torben Rick.



Archaeological shell midden on Santa Rosa Island, California. Photo courtesy Torben Rick.

tem simply has no historical baseline and appears to be the result of contemporary conservation and protection efforts. This case also demonstrates the incredible resilience of the system, as these animals recovered from the verge of extinction (caused by the 19th century's global fur and oil trade) in just about a century.

Ancient Channel Island peoples also reduced shellfish size, abundance, and probably age profiles through intensive predation that began over 10,000 years ago. Similar to the case of the Hawiian rats, the human introduction of dogs, and possibly the island fox, also severely altered sea bird breeding habitats. Conversely, ancient human hunting of sea otters may have enhanced and improved the productivity of abalones, urchins, and other shellfish species.

These examples demonstrate that ancient Channel Island seascapes (and landscapes) were shaped by human activities for millennia and, like Hawai'i and the Rhône Valley, are riddled with the ancient ecological footprints of past peoples. Perhaps most importantly, and surprising to some, these data illustrate that hunter-gatherers, not just large agricultural societies, had a strong influence (both positive and negative) on the ecosystems they inhabited, including the oceans.

Using the Past to Improve the Future

Archaeologists around the world are carrying out sophisticated interdisciplinary studies on the ways ancient peoples, from hunter-gathers to imperial agriculturalists—and everything in between—have influenced the environments where they lived. Increasingly, archaeologists are rising to the challenges of contemporary environmental crises by providing information on long-term human environmental interactions and the ways such knowledge can inform contemporary issues. While archaeology's contribution to contemporary environmental issues continues to unfold, a few trends are emerging.

As we move into a new era when urgent environmental issues like climate change, extinction and biodiversity loss, and air and water quality seem to be taking a backseat to healthcare reform, terrorism, and the global economic downturn, it is important to remember that environmental issues cut across virtually all other political and social matters. This lesson is often pushed aside, glossed over, or championed only by a minority. The archaeological record illustrates all too well the instability that unchecked environmental degradation can have on human society.

Archaeology, however, can provide much more than just cautionary tales. The three case studies demonstrate that we cannot understand present day environments, ecosystems, or biological organisms without documenting their long-term histories and relationships with the people who lived and thrived in those environments for millennia.

While biologists and others work to restore degraded ecosystems to their "natural" state, archaeology illustrates that this natural state has been heavily influenced by ancient human activities. In fact, ecological baselines and benchmarks used to guide contemporary restoration and management have changed dramatically over time. As the Hawai'i, Rhône Valley, and California cases demonstrate, knowledge of how ecosystems change in light of human activities and climatic events over centuries, millennia, or more can help us better understand, predict, and prepare for the future's environmental uncertainty.

Archaeological studies also demonstrate that there has been no singular trend in the past towards human overconsumption and environmental degradation or ancient harmony and management. Long-term archaeological perspectives erase any notion that nature, especially during the last 10,000 years, can be separated from human actions and impact.

We must show the next generation of archaeologists, anthropologists, and the public that archaeology has much to tell us about the present and future state of the Earth's environments. Our greatest challenge is to continue to make archaeology relevant and meaningful to the modern world. Critical to this endeavor's success are university undergraduate and secondary school curricula, as well as museum exhibits and outreach programs that focus on the archaeology of long-term human environmental interactions. We must move beyond academia to engage teachers, students, and the general public on the importance of understanding the human past to promote a greener future.

References

Braje, Todd J. 2009. Modern Oceans, Ancient Sites: Archaeology and Marine Conservation on San Miguel Island, California. University of Utah Press.

Costanza, Robert, Lisa Graumlich, Will Steffen, Carole Crumley, John Dearing, Kathy Hibbard, Rick Leemans, Charles Redman, and David Schimel. 2007. Sustainability or Collapse: What Can We Learn from Integrating the History of Humans with the Rest of Nature? AMBIO: The Journal of the Human Environment 36: 522-527.

Diamond, Jarred. 2005. *Collapse: How Societies Choose to Fail or Succeed.* Viking Press.

Erlandson, Jon M., and Torben C. Rick. 2010. Archaeology Meets Marine Ecology: The Antiquity of Maritime Cultures and Human Impacts on Marine Fisheries and Ecosystems. *Annual Review of Marine Science* 2, in press.

Kirch, Patrick V. 2004. Oceanic Islands: Microcosms of "Global Change." In C. Redman, S. James, P. Fish, and J. Rogers, eds., *The Archaeology of Global Change: The Impact of Humans on Their Environment*, pp. 13-27. Smithsonian Institution Press.

Kirch, Patrick V. 2007. Hawaii as a Model System for Human Ecodynamics. *American Anthropologist* 109: 8-26.

Redman, Charles L. 1999. *Human Impact on Ancient Environments.* University of Arizona Press.

Rick, Torben C., and Jon M. Erlandson, eds. 2008. *Human Impacts on Ancient Marine Ecosystems: A Global Perspective.* University of California Press.

Rogers, J. Daniel. 2004. The Global Environmental Crisis: An Archaeological Agenda for the 21st Century. In C. Redman, S. James, P. Fish, and J. Rogers, eds., *The Archaeology of Global Change: The Impact of Humans on Their Environment*, pp. 271-277. Smithsonian Institution Press.

van der Leeuw, Sander E. 2000. Desertification, Land Degradation, and Land Abandonment in the Rhône Valley, France. In G. Barker and D. Gilbertson, eds., *The Archaeology of Drylands: Living At the Margin*, pp. 327-345. Routledge.

van der Leeuw, Sander E., François Favory, and Jean-Jacques Girordot. 2004. The Archaeological Study of Environmental Degradation: An Example from Southeastern France. In C. Redman, S. James, P. Fish, and J. Rogers, eds., *The Archaeology of Global Change: The Impact of Humans on Their Environment*, pp. 112-129. Smithsonian Institution Press.

Torben Rick is Curator of North American Archaeology and Curator for Human Environment Interactions in the Department of Anthropology, National Museum of Natural History.

MEET ARCHAEOLOGIST TORBEN RICK

Torben Rick. Photo courtesy Marcia Bakry

To view the podcast interview, visit
http://anthropology.si.edu/video_interviews.html

TEACHER'S CORNER: DOES OUR BACKGROUND SHAPE OUR THINKING ABOUT ENVIRONMENTAL ISSUES?

by Torben C. Rick

❖ ❖ ❖

For several years, I taught an undergraduate course called "Paradise Lost? The Archaeology and Ethics of Human Environmental Impacts," which offered anthropology, biology, business, and economics majors an interdisciplinary look at contemporary environmental issues using the archaeological record. The activity and essay question offered here were developed for undergraduates but could easily be adapted for high school students.

The course examined environmental crises facing our planet such as global warming, loss of biodiversity, and issues of water and air quality. We investigated these issues critically and came to the consensus that humans had caused dramatic and devastating alteration of the planet, especially during the last two centuries.

We then stepped back in time to investigate whether or not ancient peoples had also altered the environments they inhabited, what positive and negative impacts may have resulted, and ultimately what could be learned from these case studies. We reviewed famous examples. For example, students reviewed the collapse of the ancient Maya, the dramatic alterations seen in the Pacific Islands (e.g., Easter Island), and the extinction of New World megafauna at the end of the Pleistocene. We also included many less well-known examples, including success stories and cases of environmental management and enhancement. Finally, we came full circle and considered what could be learned from these case studies. During many class sessions, students led the discussions and shared their views, which were often quite provocative.

Class Activity

Before beginning the global archaeological survey, I spent a full class period talking about what I termed "human perceptions of the environment." One of the texts I used was Charles Redman's (1999) *Human Impact on Ancient Environments*. The second chapter of this book, "Attitudes Toward the Environment," is an interesting look at human worldview, ideology, and environmental ethics. In reflecting on the chapter's theme, students were asked to think about their own perceptions of the environment by interviewing one another using the set of questions given below and then discussing them in class. Finally, I asked all the students to write an essay that incorporated how they viewed the environment and ultimately how their views compared to Redman's discussion.

INTERVIEWING CLASSMATES

During class, "pair" the students so that each student has one classmate to interview, using the following questions:

1) Where are you from? Have you lived there all of your life? Where else have you lived?

2) What are people's attitudes towards the environment in your hometown? For example, are people concerned about having natural spaces (e.g., parks), water and air quality, wildlife, etc.?

3) Is your hometown environmentally conscious? If so, are there recycling or other environmental outreach programs?

4) Are your personal views of the environment the same as most people in your hometown?

5) How do people's environmental attitudes in your hometown compare to any other area where you have lived or visited?

Together students can orally share their answers to these questions, then briefly compare and contrast their experiences. One of each pair can present their differing views to the rest of the class. The discussions in my classes were usually lively, and we kept score of our hometowns in terms of which seemed more environmentally friendly and which seemed less so. This gave us opportunities for debate and led to discussions about the differences be-

tween urban areas and more rural areas. Finally, we talked about how our own life experiences, family, and friends can influence how we view the natural world and what we see as priorities for our planet's sustainability.

After the "interview" exercise was completed, I assigned a written essay.

Essay Topic

Write an essay evaluating human attitudes, ethics, and opinions of the natural environment in your hometown. How do people view the natural environment both locally and nationally? Is the environment a source of concern for local residents? Are there recycling programs or other environmental outreach programs? Are your personal views the same as the majority of people in your hometown? How do the views of your hometown compare to those of others' home towns represented in the class?

After you have evaluated your own hometown, reflect on readings by Kline (2007, especially Chs. 1, 2, 11, and conclusion), Hughes (2002, Ch. 2), and Redman (1999, Ch. 2). Focus discussions on the global attitudes towards the environment, both past and present. How do your views compare to the authors' descriptions of ancient environmental ethics?

This assignment has great utility for challenging students to think about their own biases when confronting human environmental relationships and the sustainability of our planet.

References

(For college students all three are useful; for high school students, Charles Redman's second chapter may suffice.)

Hughes, J. Donald. 2002. *An Environmental History of the World.* Routledge.

Kline, Benjamin. 2007. *First Along the River: A Brief History of the U.S. Environmental Movement.* 3rd ed. Rowman and Littlefield.

Redman, Charles L. 1999. *Human Impact on Ancient Environments.* University of Arizona Press.

Torben Rick is Curator of North American Archaeology and Curator for Human Environment Interactions in the Department of Anthropology, National Museum of Natural History.

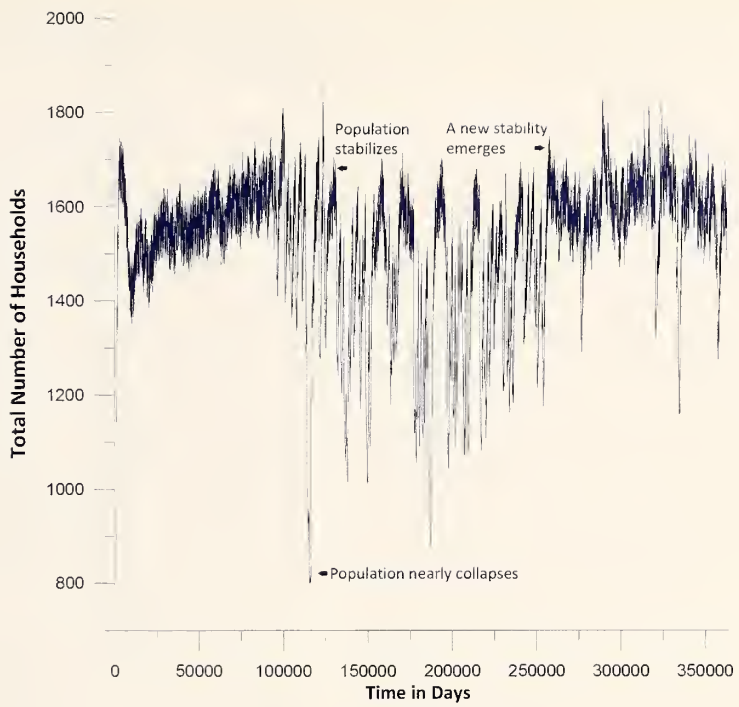
SIMULATING THE PAST TO EXPLORE THE FUTURE

by J. Daniel Rogers

❖ ❖ ❖

Throughout Earth's history there have been long periods in which the climate was relatively stable and other periods in which it was constantly changing, sometimes rapidly. Climate, as part of the environment, always has a deep impact on how people live. For a very long time, but especially since the beginning of the Industrial Revolution, people have played a significant role in climate change. As we ponder our options for developing a sustainable future, there is a profound need to understand how people around the world may be able to cope with change. But there is a problem; our information from the past is fuzzy and incomplete. The climatologists, for instance, who build projections for understanding future changes, may have quality weather data extending back only a few decades. Sometimes this informaton is not enough when we seek to understand trends occurring over the course of centuries.

At the National Museum of Natural History some of the scientists are turning to a new way to use the past to see into the future. It is called *Agent-Based Modeling*, a kind of computer simulation that builds virtual societies in which each individual person, or family, in the simulation behaves according to social norms, but also in autonomous ways, much as real people do. Working with social and computer scientists from George Mason University, Smithsonian anthropologists devised a model of the societies that herd sheep, goats, camels, yaks, and horses on the steppe lands of Central and Inner Asia. Like an elaborate computer game, the agents (people) are born, get married, have



children, visit their friends, share with family members who are in trouble, remember their ancestors, and participate in social groups. The agents also deal with problems, like droughts, snow storms, and climate change.

Using archaeological, historical, and ethnographic information on herding societies from around the world, each characteristic of the artificial society was painstakingly programmed into the simulation using software called MASON and Java. The first objective was to create an artificial society inspired by the Bronze Age (2000 to 500 B.C.) of Inner Asia. The people of the Bronze Age were members of clans and had leaders we might call chiefs, but not kings. Later, vast empires would emerge from the Inner Asian heart land, culminating in the great Mongol Empire under Genghis Khan in the 13th and 14th centuries. The Bronze Age ancestors of the Mongol Empire are the starting point, a kind of baseline on which to build a history that never happened, but could have.

The second objective was to take the replica of the Bronze Age society and actually put time in motion—the clock starts ticking and does not stop for a thousand years. On a very powerful computer this process takes about 2 actual days. The graph on this page shows the population changes for one of the simulated histories. One thing to note right away is that a huge amount of variation and change is the norm. The human population is not even remotely stable, nor does it decline or increase in a gradual way. Change is abrupt and sometimes catastrophic. The thing that accounts for most of this change is weather—snow storms and droughts. In Inner Asia these weather events sometimes kill nearly all of a herder's animals. When the animals die, the families cease to exist. This catastrophe nearly happened around simulated year 330 (120,000 days) when the population dropped by 50% due to back-to-back winter snow storms and summer droughts.

Even when climate is changing relatively quickly, as today, what people must adapt to are the extremes. Herders today, just as in the Bronze Age, must find ways to buffer against catastrophes. They can do this by developing a resilient economy. Although they cannot stop the snow storms, they can migrate, share resources, and use other strategies. One of the keys for the herders is having flexible social networks that allow change, rather than adhering to rigid behaviors—a good lesson for us all.

Dan Rogers is Chair, Department of Anthropology, National Museum of Natural History.

TEACHING HIGH SCHOOL ANTHROPOLOGY IN THE DIGITAL AGE

by Carolyn Gecan

❖ ❖ ❖

Imagine 30 high school juniors and seniors engaging in a discussion of human evolution on the first day of the new unit. All have opinions on the topic. All know about the "Big Bang," Darwin and survival of the fittest. A few can explain the concept of punctuated equilibrium. All are veterans of our school's ubiquitous ninth grade biology course and several have taken AP Biology too. They have already completed a short writing activity based on these questions about human evolutionary history: "What do I know for sure? What do I think I know? What would I like to know?" They share writings in small groups, then share group conclusions with the class. The results? Semester after semester "What do I know for sure?" has been the category with almost nothing in it. No one, it seems, would be willing to stake a semester grade on what they already know "for sure" about the evolution of humanity!

When I developed my school's one-semester anthropology elective twenty one years ago, I was already a veteran teacher. Immediately I discovered that resources for high school students were scarce. For example, an appropriate high school textbook for my students was nonexistent. Fortunately I teach at a science and technology magnet school full of bright kids with above average reading skills. The competency of these students allowed me to use an approachable college textbook suitable for an aspiring anthropologist beginning a college major. But it was deadly dull for a high school student hoping to explore an interesting but short-term elective. Fortunately, I also discovered the anthology *Annual Editions Anthropology 89/90*, published at that time by Dushkin Publishing Group. Adding *Annual Editions Physical Anthropology* rounded out the curriculum. Lack of funding to replace the books yearly coupled with the fact that students never purchase their own textbooks in our school district meant that the *Annual Editions* quickly aged into collections of historical documents.

The early efforts at research projects and other enriching exploratory activities presented other challenges. My students used the closest venue likely to help their research, the school library. There they picked through the card catalog, explored the reference section, and looked for journals that usually were not in the library's collection. Whatever information they gleaned was almost certain to be sparse and out of date. The few anthropology-themed films then available were videotapes from state and county collections which often did not arrive in time for use during the intended unit of study. Lectures were illustrated with overhead transparencies or personal slide collections and a trusty Kodak carrousel projector. In spite of encouraging my students to be independent learners, the paucity of resources meant that they often learned the same thing at the same time.

Because of the students' general maturity and ability levels, they did have the opportunity to do some ethnographic reading not usually available to high school students. They read one or more of the following classics: Marjorie Shostak's *Nisa*, Colin Turnbull's *The Forest People*, Elizabeth Marshall Thomas' *The Harmless People*, or Napoleon Chagnon's *Yanomamo*. Through reading, writing, and discussing these books, the students' anthropological horizons were broadened.

Then as now, field trips were severely limited to one trip per semester to a destination suitable for the curriculum *and* not too far away from campus. Transportation costs, travel restrictions, and time away from other classes dictated this one four-hour trip. Our choice was between visiting the National Zoo's primates or the Smithsonian's Natural History Museum. Given the choice, the class chose apes over artifacts every time.

The Digital Age

We started with a few esoteric computer labs and rudimentary search engines in the mid 1990s. We now use powerful electronic databases accessible wirelessly from any computer in the school—and available to the students in their homes. While these advances have spurred changes across the curriculum, high school anthropology has been transformed by them. Take, for example, teaching about human evolution.

With limited access to contemporaneous discoveries as they unfolded in the field or lab, high school teachers twenty years ago depended mostly on popular press coverage of new finds. A rare fossil hominid in east Africa, a cache of stone tools, or Paleolithic butchering site, all were equally remote from our studies. The high school library subscribed to *National Geographic Magazine* but not the AAA Journal. When *AnthroNotes* arrived in the mail, I diligently photocopied any articles about human evolution for my students—and often saved the stacks of copies for subsequent semesters. I enthusiastically welcomed a class set (30 copies) of the 1998 first edition of *Anthropology Explored: The Best of Smithsonian AnthroNotes,* but continued photocopying each new *AnthroNotes* issue when it came. Now with *AnthroNotes* online, I post the link on Blackboard.com. An added bonus of the online version is that my students benefit from seeing the illustrations as crisp images in full color. The additional perks on the website encourage further exploration.

Incredibly useful searchable databases such as EBSCOHost Research, JSTOR, ProQuest Direct, and eHRAF (Human Relations Area Files) extend the reach of teacher and student alike. Though initially available only while using the school's library workstations, these tools are now accessible free of charge 24/7 from anywhere one can get WiFi. These databases provide access to some of the most recent scholarly papers on discoveries and changing theories about human evolution. Recent selections in my class included the following articles that captured the interest of my first period students as they prepared for seminar discussions. None of the students were assigned to read a particular article—each selected something that appealed to his or her interests.

- "Cooking Up Bigger Brains" by Rachael Moeller Gorman in *Scientific American,* December 2007.
- "The Evolution of Human Skin and Skin Color" by Nina G. Jablonski in *Annual Review of Anthropology,* 2004.
- "What Finnish Grandmothers Reveal about Human Evolution" by David Biello in *Scientific American,* July 2007.
- "Natural selection and the elusiveness of happiness" by Randolph M. Nesse, published online August 2004 by The Royal Society.
- "The role of climate in human mitochondrial DNA evolution: A reappraisal" by Chang Sun, Qing-Peng Kong, Ya-Peng Zhang in *Genomics* 2007.

A relatively recent phenomenon, the blog, has greatly enlivened the classroom scene. Blogs maintained by scientists working in the field or by individuals reporting on new scientific discoveries allow students to become directly involved or to observe lively exchanges among scientists. By going to *ScienceBlog,* for example, one can read about Ardi, the *Ardipithecus ramidus* skeleton found in 1994, but now making a new set of waves in the world of paleoanthropology. What opinions are scientists posting about Ardi and the latest claims being made about the bones? To observe scientists' excitement or hear their words first hand, students can watch on-line interviews about new discoveries—at any time day or night that suits the students' schedules.

Whereas once we looked at pictures of ancient hominid skulls and skeletons painstakingly transferred to overhead transparencies or slides—the library only possessing one copy of any particular publication—we now search entire websites devoted to advancing our understanding of human evolution. At Google Images, for example, my students can view photos of Ardi's teeth, bones, and skull. In addition they can find a diagram showing Ardi's possible place on the human family tree, a map of where she was found, and so on. If I want my entire class to view these images simultaneously as we discuss them, I turn on my Smart Board which is linked to my laptop. The computer image is shown on the Smart Board by a ceiling-mounted projector. As a result, I have a giant touchscreen computer that I can manipulate in every way identical to what I can do on my laptop—except that the screen is visible to the entire classroom. A student can use the Smart Board to navigate the class to other images by clicking and dragging as would be done on a laptop with a mouse.

Once I lectured about archaeological dig sites and showed slides with a Kodak projector. Now my students take virtual field trips to remote and wonderful sites via

the Web. Creating a web tour of reputable photo sites or by posting my own Power Point presentation on Blackboard.com, I can send my students to the Afar region of Ethiopia where Ardi was found or to the legendary site not far away where Donald Johansen found Lucy. In a matter of minutes, they or I can cut and paste images of both skeletons for a side-by-side comparison in a Power Point presentation. Stone tools can be seen *in situ* or in the hands of a scientist who has removed them from the dirt.

A very popular element in the evolution portion of the course comes when we briefly study non-human primates. Although we do visit the National Zoo to see the primates first hand, in the classroom we have access to many more animals and places. We can "visit" another continent to see the animals in their natural habitats thanks to *National Geographic* video feeds such as one online showing "new bonobo ape population discovered" that was posted in 2007. At another site, Primate Info Net (http://pin.primate.wisc.edu/av/vocals/) students can listen to over 80 vocalizations of an extensive number of lemurs, monkeys, and apes. These sound files can greatly enhance a student group Power Point presentation!

In spite of these and many other enhancements to teaching high school anthropology, the Digital Age imposes special burdens as well. Too many students are content with the fastest and most efficient source for gathering information to get an assignment finished: Wikipedia. While gathering so much information in one location might have positive aspects, it does not help today's young researchers develop research skills and critical thinking. In fact, it does just the opposite. A few clicks, students spot the desired information, copy, paste, finish. No questions asked, not to mention the problem that they may have just plagiarized material without thinking about what they have done. Moreover, with so many sites available to them worldwide, students need to learn the difference between crackpots and reliable scientists just as much as they needed to when their sources were library books, encyclopedias, and hard copies of journal or magazine articles. Modeling good search techniques for students and helping them recognize reputable sources is vital to their education.

When using online data, opportunities for plagiarism and misappropriation of files and information abound. Although a student may excel at manipulation of data and pictures to make an amazing Power Point presentation, judging accuracy must be only part of the teacher's evaluation of the work. The necessity of asking questions about sources, having students show their research paths and focusing on whose words they used is a vital part of instruction in the Digital Age. Teaching students how they can obtain permission from owners of web-based data can help them become responsible consumers and users of such information.

I am fortunate that I have remained in the teaching profession as long as I have. Now with my students often placed in the role of guide, I'm exploring the transformative potential of podcasts, blogs and wikis. The revolution in curriculum wrought by the Digital Age advances have retooled my course and refreshed my teaching in ways I could not have imagined more than twenty-one years ago. Learning in a Digital Age classroom is an enriching, communal experience for student and teacher alike. When confronted by the many questions for which I have no answers, I am as excited as my students are to search online for information and answers—and all the new questions that arise from those answers. I hope future changes in technology continue to make teaching high school anthropology as exciting for the next generation of teachers as it has been for me.

Carolyn Gecan, an AnthroNotes editor, teaches anthropology at Thomas Jefferson High School for Science and Technology in Fairfax, Virginia.

PLEASE SIGN UP!

ANTHRONOTES IS GOING GREEN!
TO REDUCE PAPER AND PRINTING COSTS, PLEASE SIGN UP FOR THE ELECTRONIC VERSION.EMAIL

ANTHROUTREACH@SI.EDU.

CHANGING CULTURES AND CLIMATE IN THE ARCTIC: PREHISTORY TO MODERN TIMES

by William W. Fitzhugh

❖ ❖ ❖

[**Editor's Note:** This article is based on the author's *webinar* presentation for the "Smithsonian Online Education Conference: Climate Change," which took place September 29-October 1, 2009. To view the full presentation, with over 80 illustrations, go to the conference site at http://www.smithsonianconference.org/climate/]

Arctic regions have inspired our imagination since the Vikings returned from Greenland with narwhal tusks, and romantic painters drew ships dwarfed by towering icebergs. Martin Frobisher, one of the first Europeans to explore the Arctic, searched for a route to Cathay (China) through Arctic North America in the 1570s and produced the first descriptions of the Inuit (Eskimos). He returned to England with a cargo of fool's gold, while the small cottage he built in Baffin Island quickly turned to rubble. When I explored the site in the 1990s, nothing remained but bits of mortar and worthless ore.

One reason for Frobisher's failure was timing. Five hundred years earlier—like today!—he could have sailed right through the Northwest Passage. But he was sailing during the Little Ice Age's beginnings, one of the coldest periods in the Northern Hemisphere in the last 10,000 years. That same cold climate also led to the Viking colonies' extinction in Greenland and the southward advance of Inuit (Eskimos).

It turns out that the Arctic is one of the most sensitive environments on earth—all because of water's freezing point. Drop the temperature below 32 degrees F. and millions of square miles of the earth's surface turns to snow or ice; warm it a few degrees and much of the world turns to bog or water. No other place on earth has a temperature switch with such massive consequences. Despite this, Arctic plants, animals, and people have adapted as the world changed from glaciers to grass, from pack ice to open ocean.

Today climate change is bringing us an Arctic world we have never seen before. Temperatures are much warmer than just 20 years ago. But it turns out that the Arctic's temperature switch has been off and on again many times in the past.

In 2007 I helped lead a two-week Smithsonian Journeys trip exploring global warming in the Arctic. We had climate scientists, reporters, paleontologists, economists, and 100 guests on board a Russian ice-breaker that took us north of Bering Strait to Wrangel Island, a near mythical place 100 miles off the Siberian coast. Many early explorers lost their lives and their ships trying to reach Wrangel, even during summer.

Our July 2007 voyage was different—no ice, only a couple of polar bears, and plenty of musk-ox, walrus, and whales. The Arctic sea ice retreated farther north than ever recorded before. En route we heard from native Siberians that Pacific sharks and killer whales had appeared, and that polar bears were wandering around the Siberian mainland stalking reindeer. "We've not seen these things before," one of them reported.

As an archaeologist I am used to looking deeper into the past than people's memories—or even recorded history. Archaeology gives us a way to study history hun-

The walrus' habitat is melting under them as the Arctic ice cover shrinks.

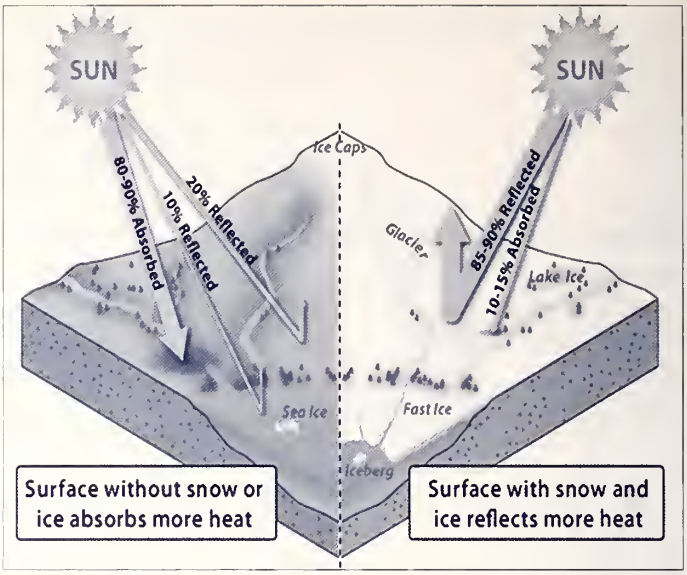
dreds, thousands, and even millions of years ago. Our studies show that climate change has been a constant companion of Arctic life for thousands of years. The questions we ask include:

- How has the Arctic changed over both long and shorter periods of time?
- How has climate change influenced Arctic and world history?
- What can we learn from Arctic history to help us in the future?

The Arctic Climate Cycle

The Arctic climate cycle can be broadly explained by a relatively simple "albedo model." Cooling climate produces more sea ice and snow, expanding the ice-covered portion of the earth. Since snow and ice are white, they reflect more solar energy back into space, multiplying the original cooling in a process called climate 'feed-back.' As the North cools, polar currents export more cold water and ice into southern waters, cooling the Subarctic and Temperate coastal zones. In places like Labrador on North America's East Coast, the extension of the Labrador Current brings Arctic pack ice farther south, and with it comes seals, walruses, polar bears, and other northern animals. Growing seasons become shorter; the northern forest limit moves south and temperate species like deer and moose are replaced by caribou and seals. In an Ice Age, continental ice sheets and Arctic conditions advance deep into the temperate zones of Canada and the northern United States.

Warming climates have the opposite result. As land ice, snow, and ocean pack ice melt, the darker surfaces of land and water that are uncovered absorb solar energy, multiplying the warming effect. Glaciers, winter snow cover, and forest and animal boundaries move north and the Arctic realm gets smaller. Of course people and cultures adapted to the tundra and northern seas or to the warmer forest zones react in similar fashion. We would expect Arctic peoples to expand south during cooling phases and retreat north again during warm phases. Forest people would react in the opposite manner, moving north as the forest boundary moves north, and retreating when ice retreats southward in cool periods. In reality, this northern climate-culture interaction model is not quite so simple because warming and cooling phases vary in intensity, duration, and even by region.



Albedo processes for Arctic summer and winter.

The Siberian Paleolithic and Mesolithic

During the first 2.3 million years of human history, cycles of cold glacial periods alternated with warmer interglacials like the warm period we have been in for the past 10,000 years. Geologically the icy period is known as the Pleistocene. Ice covered Europe and North America, pushing animals—and people—thousands of miles south of the northern limits they had reached during the warm periods. In spite of these cold periods, culture and art flourished along the glaciers' southern margins. Cold is not necessarily 'bad'—only if you do not know how to deal with it.

When the present Holocene interglacial started, Eurasia warmed quickly, especially in Siberia where there were no ice sheets. Melting glaciers caused oceans to rise to near their present levels between 12,000-8,000 years ago. At the end of this period—a time that was warmer than it has ever been since—people settled on tiny Zhokhov Island, 300 miles north of the Siberian coast. For many years they lived in driftwood houses eating caribou and polar bears. However, as sea levels continued to rise, people eventually had to retreat far to the south.

When the sea level was lower, 500 miles east, Wrangel Island, like Zhokhov Island, was also part of the Siberian

mainland. Recently Russian scientists found mammoth remains on Wrangel Island. These tundra-dwelling Ice Age elephants were nearly the size of modern elephants. In addition to large mammoths, scientists found bones of much smaller mammoths. Most of the large animals dated 10-20,000 years old, but the small mammoths—barely taller than a large dog—were only 5000 years old. Soon after that, they became extinct, outlasting all other mammoths on earth by 5000 years. Paleontologists believe that the Wrangel Island mammoths grew progressively smaller after the sea level rose and isolated Wrangel from the mainland. Humans arrived on Wrangel about the same time, raising an interesting question: What finally killed off the Wrangel mammoths—climate, or humans? We still don't know!

Paleoindians Arrive in America

At the end of the Pleistocene, 12,000years ago, the northern hemisphere warmed rapidly. Ice sheets melted, vegetation zones moved north, and sea levels rose. These climate-related changes coincided with the first people arriving in America. Migrating across the land bridge between Siberia and Alaska, or—equally possible—traveling over the ice, or voyaging by boat, these early Siberians spread south along the Pacific coast or through an inland ice-free corridor in western Canada. The earliest identifiable culture in North America is called Clovis, after the archaeological site that produced the first distinctive fluted spear point that defines these people's culture. Within 1000 years Clovis people had spread throughout North and South America, creating the foundation for all later cultures of the New World, except in the Arctic.

Excavations at 8,000 year old Zhokhov Island site in the Siberian Arctic. Photo courtesy William Fitzhugh.

Paleoeskimos Arrive and Spread

About 5000 years ago a different Siberian group looking more Mongoloid than their Paleoindian predecessors reached Bering Strait. Their culture included use of tiny blades and delicately chipped arrow points. They also used a simple type of clay pottery and burned seal oil in their lamps. By 5000 years ago this Siberian 'Neolithic' culture had become established in western Alaska. These early Paleoeskimos had learned how to inhabit the tree-less Arctic tundra along the coast of Arctic Alaska north of the forest boundary.

During a warming trend between 4500-4000 years ago, Paleoeskimos spread into the previously unoccupied North American Arctic. Within a few hundred years they had settled all of northern Canada, the entire Greenland coast, and northern Labrador, living in small tents, hunting caribou, musk-ox, and seals with spears and simple harpoons. These early Paleoeskimos were more accustomed to hunting on land than at sea and heated their tents and food with driftwood or animal bones.

When Paleoeskimos reached Labrador they found they were no longer the only people there. The early Holocene's warm climate had brought forests to Labrador, along with Maritime Archaic Indians, the descendants of northeastern Paleoindians. After the disappearance of mammoths and other Ice Age game, Paleoindians had become adept hunters of seals, swordfish, walruses, and small whales along the northeastern coasts from Maine to Labrador. For 5000 years their culture thrived and in some respects resembled the maritime Indians of Alaska and British Columbia. Large longhouse sites, burial mounds and cemeteries filled with exotic grave goods reveal a rich and complex maritime culture with trade connections from Maine to Labrador.

But the Maritime Archaic culture was forest-based and even its maritime hunting depended on wooden or birch bark boats, not the skin-covered kayaks used by Arctic peoples. Instead of sea-mammal oil lamps they used open wood fires. By 3500 years ago, when climates turned cold and the treeline began to recede south, Maritime Archaic people faced stormier seas, longer winters, more Arctic pack ice, and shorter and cooler summers—as well as something else they had never encountered before—Eskimos, or Inuit as they are called today.

The same conditions that made life more difficult for Maritime Archaic Indians were advantageous for Paleoeskimos. As climate cooled during the next 2000 years, Maritime Archaic Indians withdrew to the south, closely followed by Paleoeskimos who advanced into the former Indian territories in Labrador, Newfoundland, and even the Gulf of St. Lawrence. This early Eskimo advance reached its southernmost limit in the Gulf during the cold period between 500 BC to 1 A.D.

Humanity Goes Global

Our final examples of Arctic climate impacts come from the last 1000 years and the meeting of two cultures—Europeans and Inuit—in northeastern North America. It turns out that their arrivals had everything to do with climate change—in this case, a warming climate. The first Europeans to reach North America—the Vikings—and their encounter there with the Inuit can also be viewed as the last chapter in humanity's great migration out of Africa, in opposite directions, around the earth, creating the global cultural world we know today.

The World Warms: Vikings and Inuit

The Danish and Norwegian Vikings who began moving west across the North Atlantic about A.D. 800 were spurred by warming climate and superb ships. Within 200 years Vikings had colonized Shetland Islands, the Faeros, Iceland, and eventually Greenland, which Erik the Red settled in 985. By 1000 Leif Eriksson and other Greenland and Icelandic Norse had reached Newfoundland and the Gulf of St. Lawrence, where they established a colony in "Vinland." In the 1960s "Vinland" was discovered in northern Newfoundland at a site called L'Anse aux Meadows. Its three sod houses and shops conform to the Viking saga accounts and date exactly to A.D. 1000. But the Norse soon abandoned this site and the Vinland region probably due to Indian and Eskimo attacks and the high cost of maintaining a colony so far from Greenland and Iceland. Nevertheless a Norwegian penny dating to 1085 found in an Indian site on the Maine coast shows that Greenland or Iceland Norse continued to voyage to the American mainland, obtaining timber for building boats.

Thule (Eskimo) carving of a Norseman seen in Hudson Strait ca. A.D. 1300. Courtesy Canadian Museum of Civilization.

Norse expansion to North America was facilitated by the Medieval Warm Period of A.D. 800-1300 indicated by advancing northern forests, melting Alpine glaciers, sea ice reduction, and increased grain and grape harvests in Europe. Warming made Viking voyages safer and Viking farms more productive, and commerce with Europe flourished. Greenland's products included wool, textiles, walrus ivory, as well as elite items like falcons and narwhal (i.e. "unicorn") tusks. At its peak in the 1200s, Norse Greenland was a thriving European colony of 5000 people with many Christian churches and its own Catholic bishop.

However, soon after the Inuit became established in the Eastern Arctic, around A.D. 1200, the weather turned colder; by 1500 the region had entered a phase known as the Little Ice Age. European historical records note crop failures, poor harvests, and increasing North Atlantic ice that endangered shipping. In Greenland, the Norse colonies began to suffer as their animals declined and sea ice and storms restricted European contact. By 1350 the Norse Western Settlement was abandoned; in the early 1400s the larger Eastern Settlement disappeared. By 1450 Inuit groups were advancing south, occupying former Norse lands, thriving there as sea mammal hunters and fishermen where the agricultural Norse had starved. Climates that once favored the Norse now required an entirely different way of life, one of fishing and hunting, which the now Christian Norse considered a barbarian way of life.

By 1600 the Inuit were raiding the European whaling and fishing stations in Newfoundland and the Gulf of St. Lawrence. But the story of these Arctic people, the southernmost Inuit in the world, did not end happily. Historical reports indicate that the Inuit who moved here during the cool 17th and early 18th centuries were killed or driven back north by Indians allied with French and English settlers. By the mid-1700s all Inuit had disappeared from southern Labrador and Quebec and were located where they

live today, hundreds of miles to the north in central and northern Labrador.

This last chapter in our story illustrates the complexity of interpreting culture history from any single point of view. Yes, Inuit movements into southern Greenland, Labrador, and the Gulf of St. Lawrence were facilitated by the expansion of Arctic pack ice and marine mammals during the Little Ice Age. The expansion of the Arctic marine niche provided migration incentive for a people already adapted to these conditions.

Yet other factors must have been involved—initially a desire to obtain practical European objects like sturdy wood boats and iron, but later, items of social value like glass beads, textiles, and ceramics, things Inuit could live without, but nevertheless desperately wanted. Untangling the various factors in addition to environment and subsistence requires consideration of such influences as technology transfer, religious conversion, culture contact, prestige, and inter-group marrying. THIS is what makes archaeology so fascinating and complex, but ultimately the only way to understand the prehistoric past.

Archaeology for the Future?

Arctic archaeology demonstrates that today's changes are partly a result of natural climatic cycles that the earth has undergone for eons, often having great impact on human cultures. Some peoples have prospered while others have disappeared. For the northern archaeologist today, one of the most severe problems is the loss of sites to coastal erosion as a result of rising sea levels. However, this is nothing compared to the far more serious societal problem of whole villages being eroded by the rising sea. Today, technology provides some tools to combat these threats, but the first order of business is to reduce the human component in global warming.

The human and environmental impacts of the changing Arctic were explored in a 2007 exhibition at the Smithsonian's National Museum of Natural History called *Arctic: A Friend Acting Strangely.* This exhibit can be viewed on the web at (www.forces.si.edu/arctic)

Lessons from these northern studies show that: (1) Change is inevitable—but we can influence its outcome; (2) Listen to elders; (3) Adapt, because we probably can't force the system; (4) Understand the science, because it's more important than ever before; (5) Learn lessons from the past. One lesson from Norse Greenland is the danger of over-exploiting resources. What may work in 'good times' may fail catastrophically when the climate turns the other way, and finally, (6) Don't make things worse—nature provides challenge enough.

References

Diamond, Jared. 2005. *Collapse: How Societies Choose to Fail or Succeed.* Viking Press.

Fitzhugh, Willlam W. 2008. Arctic and Circumpolar Regions. In Deborah M. Pearsall, ed., *Encyclopedia of Archaeology*, pp. 247-271. Academic Press/Elsevier.

Fitzhugh, Willlam W. 2002. Yamal to Greenland: Global Connections in Circumpolar Archaeology. In Barry Cunliffe, Wendy Davies, and Colin Renfrew, eds., *Archaeology: the Widening Debate*, pp. 91-144. Oxford University Press.

Fitzhugh, Willlam W., and Elizabeth Ward, eds. 2000. *Vikings: the North Atlantic Saga.* Smithsonian Institution Press.

Hoffecker, John F. *2005. A Prehistory of the North: Human Settlement of the Higher Latitudes.* Rutgers University Press.

McGhee, Robert. 2007. *The Last Imaginary Place: A Human History of the Arctic World.* University of Chicago Press.

William W. Fitzhugh is the Director of the Arctic Studies Center, Department of Anthropology, National Museum of Natural History.

Saami (Lapp) reindeer-herder relaxes with new transport vehicle. Photo courtesy Bryan and Cherry Alexander.

Online Professional Development Opportunity: Knowing Shelter—Knowing People

by Jeanne M. Moe

❖ ❖ ❖

Project Archaeology will begin offering online courses nationally on January 18, 2010, in partnership with the Smithsonian's Natural History Museum and the Utah Museum of Natural History at the University of Utah. To register for an online course, contact Madlyn Runburg at mrunburg@umnh.utah.edu

Project Archaeology is an educational organization and a national network of archaeologists, educators, and concerned citizens working to make archaeology education accessible to students and teachers nationwide through professional development and high-quality educational materials. Museum educators, youth group leaders, and heritage site interpreters use Project Archaeology materials in informal learning environments. Project Archaeology is a joint program of the US Bureau of Land Management and Montana State University. The Smithsonian's Department of Anthropology sponsors the Chesapeake Region Project Archaeology Program, one of 27 regional offices across the country.

Investigating Shelter Series

Project Archaeology has produced a new curriculum, *Project Archaeology: Investigating Shelter* (Letts and Moe 2009), which leads students to discover how everyday people lived in North America long ago, how they got their food, and how they spent their time. Appropriate for grades 3-5, the curriculum meets many US national standards in social studies, science, literacy, mathematics, visual arts, and life skills. The curriculum engages students in the processes of scientific inquiry and teaches skills such as observing, inferring, using evidence, questioning, and classifying. The National Council for the Social Studies recently endorsed *Investigating Shelter* as a program that "seeks to educate children on the cultures of the past and how they have endured to the present."

The published curriculum contains a complete archaeological investigation of a Pawnee earthlodge, a dwelling of the Central Plains of the United States. One of its teaching activities, Every Picture Tells a Story, is located on the Smithsonian's Department of Anthropology's webpage: http://anthropology.si.edu/outreach/Teaching_Activities/index.htm.

There are eight other shelter investigations:

- Plains Tipi (Wyoming, Montana, South Dakota)
- Northwest Coast Plank House (Alaska, British Columbia)
- Slave Cabin (Virginia, Nationwide for US History Standards)
- Ute Rock Shelter (Colorado, Wyoming, Utah)
- Historic Homestead (Montana and the Northern Rockies)
- Earthfast House (Maryland, Virginia, District of Columbia, Nationwide for US History Standards)
- Pueblo (Colorado, Utah, Arizona, New Mexico)
- Great Basin Wickiup (Oregon, Nevada, Idaho, California)

Each investigation contains oral histories, historic photographs or drawings, archaeological site maps, and artifact illustrations, all of which allow students to use authentic primary data to investigate past cultures. Some investigations are available in interactive format and include voiceovers so that students can hear the oral histories while they are reading. Additional resources such as historic photographs, illustrations, and lists of appropriate children's books are also available online. Classroom ready activity pages also are available for download.

The Project Archaeology's shelter investigations are available through professional development. In addition to the new online opportunity, educators may attend inservice and preservice workshops through one of 27 state and regional Project Archaeology programs. (Locate your local program by visiting www.projectarchaeology.org/contacts.html.)

Reference

Letts, Cali A., and Jeanne M. Moe. 2009. *Project Archaeology: Investigating Shelter.* Montana State University.

Jeanne Moe is the Project Archaeology Lead for the US Bureau of Land Management.

Anthropology Explored
The Best of Smithsonian AnthroNotes

Anthropology Explored, Revised and Expanded. Edited by Ruth Osterweis Selig, Marilyn R. London, and P. Ann Kaupp (Smithsonian Books). Foreword by David W. McCurdy; illustrations by Robert L. Humphrey. *(496 pp., 54 b&w illustrations, paperback, $21.95)* Cover photo © Jean Vertut.

* * *

"clearly written and readily accessible to a lay audience [with] up-to-date information, and stimulating topics...this superb collection deserves to be widely read and utilized....*AnthroNotes* has played a pioneering role in making cutting-edge anthropological research available to non-scholarly audiences."

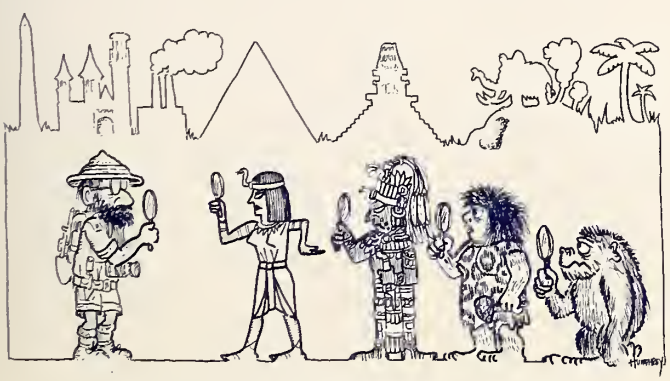
American Anthropologist

In this New Edition

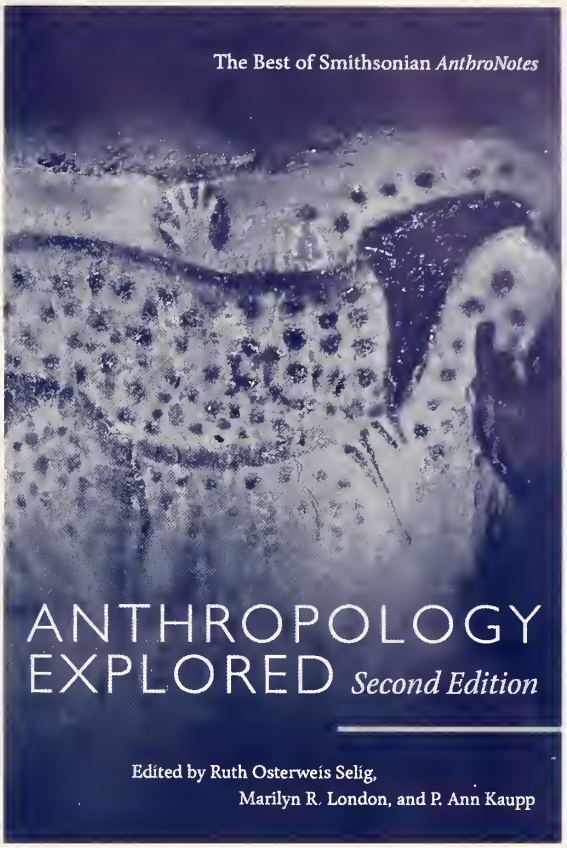
- 13 new chapters on current topics: repatriation, primate & human aggression, the Maya, refugees, universal human rights, forensic anthropology, human origins, race & ethnicity, body art.

- 23 chapter updates focusing on new technologies, DNA & genetics, global warming & the environment; a new Introduction; and 36 chapter abstracts.

Also free ***Instructor's Guide*** available at http://anthropology.si.edu/outreach/Teaching_Packets.html.



This revised edition includes more than 40 cartoon illustrations by archaeologist Robert L. Humphrey.



ISBN # 1588340937

Smithsonian
National Museum of Natural History

Anthropology Outreach Office
National Museum of Natural History
Washington, D.C. 20560

Official Business
Penalty for Private Use $300

To be added to the mailing list, go to http://anthropology.si.edu/outtreach/outrch1.html or email anthroutreach@si.edu.

AnthroNotes® offers in-depth articles on current anthropological research, teaching activities, and reviews of new resources. *AnthroNotes* was originally part of the George Washington University/Smithsonian Institution Anthropology for Teachers Program funded by the National Science Foundation. It is published free-of-charge twice a year. A compendium of *AnthroNotes* articles is available as *Anthropology Explored: The Best of Smithsonian AnthroNotes* http://anthropology.si.edu/outreach/instructorsguide.pdf

❖ ❖ ❖

ANTHRONOTES has a three part mission:

1. To more widely disseminate original, recent research in anthropology in order to help readers stay current in the field;
2. To help those teaching anthropology utilize new materials, approaches, and community resources, as well as integrate anthropology into a wide variety of subjects; and
3. To create a national network of anthropologists, archaeologists, teachers, museum and other professionals interested in the wider dissemination of anthropology, particularly in schools.

ANTHRONOTES® STAFF: P. Ann Kaupp, managing editor; Ruth O. Selig, Alison S. Brooks, Carolyn Gecan, editors.

HAVE YOU MOVED RECENTLY?

Please don't forget to notify ***AnthroNotes*** editors.Please send your change of address as soon as possible to the address below or email: Anthroutreach@si.edu.

❖ ❖ ❖