



MAMMOTH TRUMPET

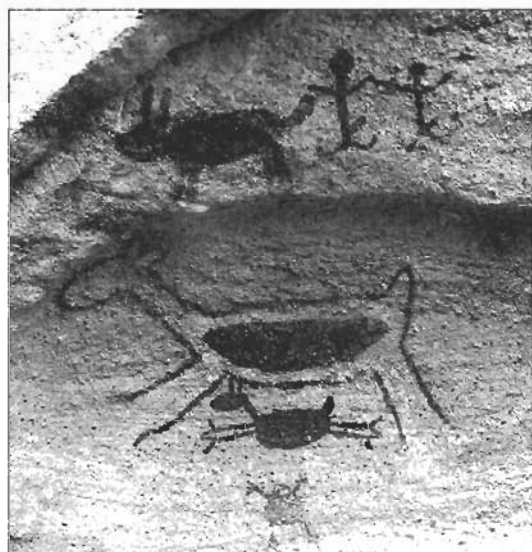
Volume 17, Number 4 ■ September, 2002

Center for the Study of the First Americans
Department of Anthropology, Texas A&M University
College Station, TX 77843-4352

Art by the Descendants of Early, *Early* Americans

These mother-and-child animals from the Pedra Furada rockshelter in Brazil, which represent nurturing and preserving for future generations, are the official logo for the Serra da Capivara National Park. Painted images from Brazilian archaeological sites also appear on beautiful glazed ceramic serveware produced locally to benefit FUMDHAM, the organization established by Niède Guidon. In the 1960s Dr. Guidon first came from São Paulo University to investigate rockshelters. Today the FUMDHAM museum houses an impressive collection of historic and prehistoric human remains, and her continuing exploration of rockshelters and caves is pushing the arrival of the first people in South America farther back in time. The collection now includes the oldest human remains in the New World—teeth and mandible dating to around 15,000 CALYBP! Our story of Guidon's exciting finds of South American Paleoindians starts on **page 4**.

The artist who did this rock painting hails from more recent times, but science writer Paul Bahn of the UK cites evidence of much earlier artists at Pedra Furada discovered by Maria Conceição Meneses Lage. Using such sophisticated techniques as X-ray fluorescence, Dr. Lage's analysis of pigments shows that some samples from archaeological layers had been treated to remove big quartz crystals that occur naturally in local ocher sources. Her conclusion? Artificial pigments at Pedra Furada go back more than 20,000 years. Her



ALBERT RUSSELL NELSON

work is discussed in *Dating and the Earliest Known Rock Art* (Oxbow Books: Oxford), which Dr. Bahn coedited with M. Strecker. Bahn also tells us that Fabio Parenti's monograph on Pedra Furada is now available from a French publisher. For highlights of Dr. Parenti's monumental work, including ordering information, see **page 7**.

The Center for the Study of the First Americans fosters research and public interest in the Peopling of the Americas. The **Center**, an integral part of the Department of Anthropology at **Texas A&M University**, promotes interdisciplinary scholarly dialogue among physical, geological, biological and social scientists. The **Mammoth Trumpet**, news magazine of the **Center**, seeks to involve you in the peopling of the Americas by reporting on developments in all pertinent areas of knowledge.

MAMMOTH TRUMPET



Volume 17, Number 4
September, 2002

Center for the Study of the First Americans
Texas A&M University, College Station, TX 77843-4352

Department of Anthropology
ISSN 8755-6898

World Wide Web site <http://www.centerfirstamericans.com> and <http://www.peak.org/csfa/csfa.html>



HOWDY from the great state of Texas. The **Center** has officially moved its operation from Oregon State University to Texas A&M University (TAMU) in College Station. After 11 years at OSU, the **Center** has found a permanent home within the Department of Anthropology. It is a home that will facilitate new research, outreach, and teaching opportunities in First American studies and provide institutional and financial stability for the **CSFA** over the short- and long-term.

Filling a semi-trailer with things that make **CSFA** work, to get ready for The Move.

The Move was an enormous undertaking that involved moving all **CSFA** materials from OSU to TAMU—2100 miles southeast of Corvallis. **CSFA** staff and volunteers began packing equipment, library, publications, and collections in January. When the packing was finally completed June 27, over 900 catalogued boxes and other items completely filled a semi-trailer. Once at Texas A&M, the process was reversed. We are still unpacking and anticipate that the **CSFA** office will be fully



Initial discussions between the **CSFA** and Texas A&M Department of Anthropology and College of Liberal Arts began more than a year ago. Following productive discussions among TAMU officials, the **CSFA** Advisory Board members, and the Director, a decision was made in mid-January 2002 to move the **CSFA** and its programs to the Texas A&M Campus beginning July 1, 2002. An agreement that the **CSFA** will continue with its research, education, and outreach projects insures continuity in **CSFA** programs.

operational September 2, when classes resume on the Texas A&M campus.

Texas A&M

Texas A&M University is an old and respected institution of higher learning. It was the state's first public institution of higher education, opening in 1876 as the Agricultural and Mechanical College of Texas. *U.S. News and World Report* ranks the university in the top 15 public institutions in the U.S. The campus is enormous, covering 5500 acres. The corresponding

student population is also large—anticipated enrollment for fall 2002 is 46,000 students. Fortunately, a wealth of intellectual resources is available on campus, including a rich matrix of disciplines suited to first-rate research in First Americans studies.

The **Center** is housed within the Department of Anthropology, a unit of the College of Liberal Arts. Vaughn M. Bryant, Jr. was hired in 1971 to offer the first anthropology courses on campus. David Carlson is current Head of

INSIDE

4 Rolling back time in Brazil

It's getting hard to ignore the startling radiocarbon dates Niède Guidon and her colleagues are finding in Serra da Capivara National Park.

8 At odds with the feds, Native Americans, and fellow scientists

The conclusion of our story about the tug of war over Kennewick Man.

12 A new study revisits a classic one

Franz Boas was great, but fallible. A fresh look at his century-old milestone study breathes new life into craniometric analysis.

CSFA Office Manager Alice Hall
(below) and Assistant Office Manager
Valerie Bishop-White.



the Department. Today there are 18 full-time faculty members and several full-time research staff members. The Anthropology Program has about 180 students equally divided between the graduate and undergraduate programs working toward B.A., M.A., and Ph.D. degrees in anthropology. Over 30 courses are offered in physical anthropology, cultural anthropology, archaeology, linguistics, folklore, and environmental studies. In addition to the CSFA, the Department also houses the Nautical Archaeology Program. NAP faculty members are involved in research projects around the world with the support of the affiliated Institute of Nautical Archaeology.

While the **Center** directors will continue to collaborate with researchers all over the world, they will have many fine scholars to work with in the Department of Anthropology and allied departments, including researchers from geography, soil and crop sciences, land range ecology, geology, and atmospheric science departments.

The **Center** is physically located in the Anthropology Building in the heart of the campus next to the main university library. The **Center** will occupy almost half of the second floor of the three-story building. This space includes a recently renovated central office, reception area, and smaller offices. Additional wet and dry labs for analyses of geoarchaeological and archaeological samples are available. Specialized imaging and DNA processing laboratories will be developed during the next year.



BOTH: ROB BONNICKSEN

New resources have made it possible to stabilize key CSFA staff positions. The **Center** will continue to be headed by Dr. Robson Bonnicksen. Rob has accepted a position as tenured full Professor in the Department of Anthropology. He will be the first to occupy a newly endowed Chair in First Americans Studies in Lib-

eral Arts. Endowment funding provided from the CSFA and Texas A&M University insures long-term support for the Director.

Michael Waters (see sidebar), who holds a full Professor position in the Departments of Anthropology and Geography, has accepted the position of Associate Director of the CSFA. Thanks to a new gift from the Bingham Trust and use of existing CSFA endowment funds, a new Endowed Professorship was established; Mike will be the first to occupy the Center for the Study of the First Americans Professorship in Liberal Arts.

Alice Hall and Val White faithfully served the Director and CSFA membership for many years at Corvallis. Val is retiring, and Alice is entering graduate school in the Department of History at OSU. We will soon be recruiting a new Office Manager to assist with CSFA projects at Texas A&M.



The Mammoth Trumpet (ISSN 8755-6898) is published quarterly by the Center for the Study of the First Americans, Department of Anthropology, Texas A&M University, College Station, TX 77843-4352. Phone (979) 845-4046; fax (979) 845-4070. Periodical postage paid at Corvallis, OR 97333. e-mail: csfa@tamu.edu

POSTMASTER: Send address changes to:

Mammoth Trumpet

Department of Anthropology, Texas A&M University
College Station, TX 77843-4352

Copyright © 2002 Center for the Study of the First Americans. Permission is hereby given to any non-profit or educational organization or institution to reproduce without cost any materials from the **Mammoth Trumpet** so long as they are then distributed at no more than actual cost. The **Center** further requests that notification of reproduction of materials under these conditions be sent to the **Center**. Address correspondence to the editor to **Mammoth Trumpet**, 93 Range Road, Blue Hill, ME 04614-5110.

Robson Bonnicksen

Director and General Editor
e-mail: csfa@tamu.edu

Michael Waters
James M. Chandler

Associate Director and Associate Editor
Editor, **Mammoth Trumpet**
e-mail: wordsmiths@acadia.net

Bradley T. Lepper
Angie Shafer
C & C Wordsmiths
World Wide Web site

Editor, **Current Research in the Pleistocene**
Administrative Assistant
Layout and Design
<http://www.centerfirstamericans.com>

The **Center for the Study of the First Americans** is a non-profit organization. Subscription to the **Mammoth Trumpet** is by membership in the **Center**.

North Star Archaeological Research Program

We are pleased to announce that, concurrent with the arrival of the CSFA at Texas A&M University, Joe Cramer matched CSFA funds and established an endowed research fund in First Americans studies. Joe has had a long interest in the origins, timing, and arrival of the first people to enter the Americas. The mission of the North Star Archaeological Research Program (NSARP) will be to investigate Clovis and pre-Clovis sites in the Americas, with emphasis on eastern U.S. Mike Waters will serve as Executive Director and Rob Bonnicksen as Associate Executive Director of this fund. The initial focus of this program will be to support TAMU research focusing on the origin(s) and age of Clovis in the East, on conducting studies at known pre-Clovis localities, and on prospecting for additional Clovis and pre-Clovis sites. We anticipate that work sponsored by this fund will significantly enhance our knowledge of the peopling of the Americas.

In addition to research, the Center will continue its long history of publication and outreach from TAMU. The Center is in the process of developing a collaborative agreement with the Texas A&M University Press, a well-established university press that will expedite the publishing of CSFA books. The

CSFA will continue with the publication of the *Mammoth Trumpet* at its new Texas home in College Station. Jim Chandler will continue to serve as the editor-in-chief. We will continue to publish *Current Research in the Pleistocene* under the able editorship of Bradley Lepper. As in the past, the Center will in the future convene conferences and workshops on timely and

significant topics important to the advancement of new knowledge in First Americans studies.

Both Rob and Mike will continue with their long history of research, teaching, and involving undergraduate and graduate students in their



MIKE WATERS

Joe Cramer, whose generosity made possible NSARP, flanked by Mike Waters (left) and Rob Bonnicksen.

interdisciplinary research projects. They will both teach graduate courses and train new generations of students to continue the great search to understand the initial peopling of the Americas.

In short, the future of CSFA is bright. Texas A&M is a supportive and growing university, and the Center will flourish and attain new heights. Stay tuned. 📻

*The Directors,
Robson Bonnicksen and Michael Waters*

Michael Waters Associate CSFA Director

Michael Waters assumes the role of Associate Director of CSFA starting September 1, 2002. He will work closely with CSFA

Director Rob Bonnicksen in conducting research and outreach in first American studies. Dr. Waters will also serve as the Executive Director of the North Star Archaeological Research Program.

Mike is a Professor in the Departments of Anthropology and Geography of Texas A&M University. He has been at Texas A&M University for 16 years. Mike brings many years of experience to the Center in the fields of geoarchaeology (the application of the methods of the geosciences to archaeology) and Paleoamerican studies. He has worked extensively in Russia, collaborating with Ted Goebel (University of Nevada-Reno) at key upper-Paleolithic sites in the Trans Baikal and the Ushki Lake sites in Kamchatka. He also worked with Yuri Mochonov at Diring Yuriak in Yakutia. Mike has also worked extensively at Paleoamerican sites in the western and eastern U.S. He is one of the principal investigators at the Gault Clovis site in Central Texas with Harry Shafer (Texas A&M) and Mike Collins (University of Texas). He has worked with Tom Stafford (Stafford



DAVID HOUSE

Research Labs) and Steve Forman (University of Illinois) at the proposed pre-Clovis Topper site in South Carolina being excavated by Albert Goodyear. He has extensive experience working in the semiarid Western states and has done much collaborative research on the operation of alluvial environments in the desert Southwest. In the western U.S. he defined the Sulphur Spring stage of the Cochise culture and used his geoarchaeological

expertise to search for early sites. Over the years, Mike has visited many Paleoamerican sites in the U.S. and Mexico.

Mike Waters has published numerous articles in books and journals over the years. He is well known for his book, *Principles of Geoarchaeology*, which has become required reading in the fields of archaeology and geoarchaeology.

He was born in National City, California, in 1955 and grew up in Chula Vista (just south of

San Diego). While completing high school, he became involved with archaeological excavations and surveys in San Diego County. At the urging of Dr. Paul Ezell, Mike attended the University of Arizona and graduated with his Ph.D. in Geosciences in 1983. He studied with Vance Haynes, Julian Hayden, and Emil Haury. After completing his Ph.D., he took a position at Texas A&M University. 📻

Sheer canyon walls of the Baixao das Andorinhas, in the southern part of the Serra da Capivara National Park. Through the efforts of Professor Guidon, this area has been named to the UNESCO register of World Heritage Sites.

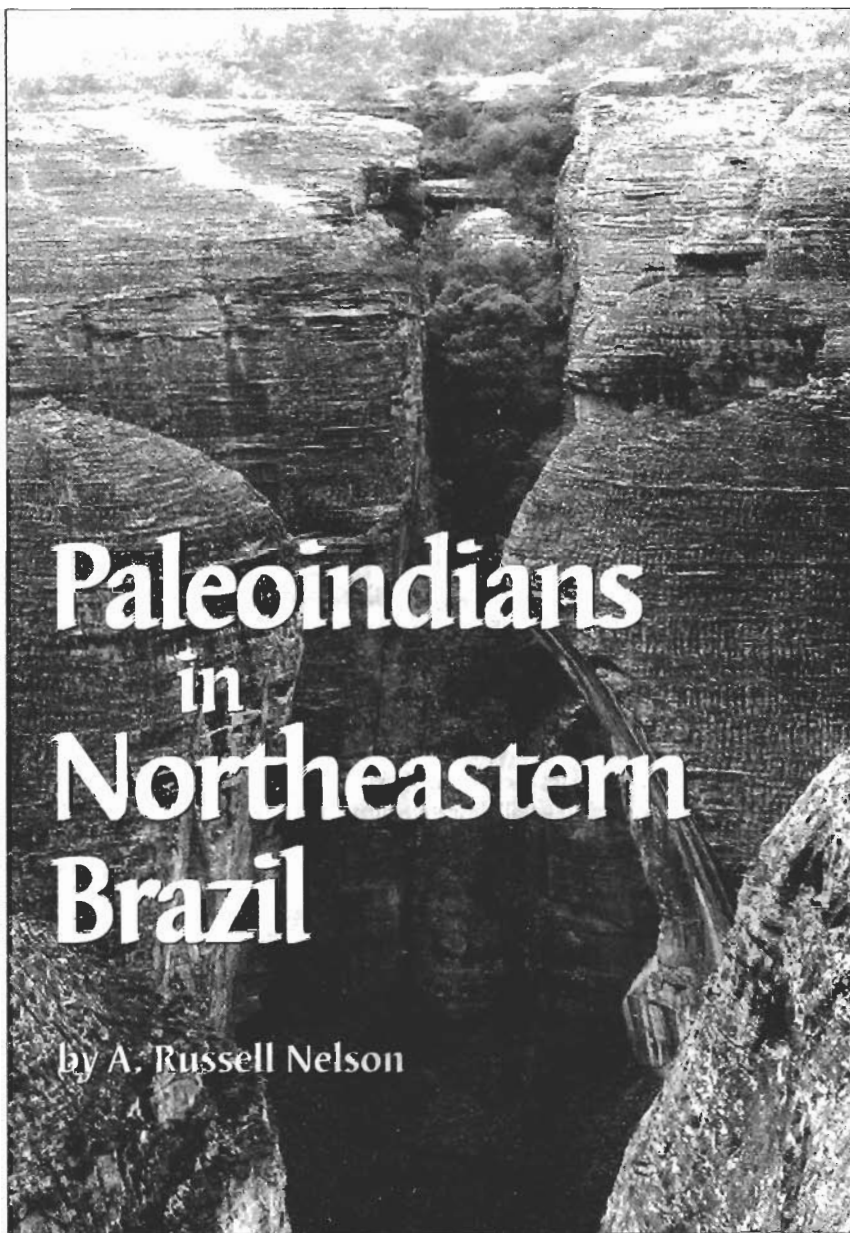
SOME OF THE OLDEST DATES in the New World have come, somewhat ironically, from sites in South America. North American archaeologists Anna Roosevelt of the Chicago Field Museum and Tom Dillehay of the University of Kentucky report dates of 10,000–12,000 RCYBP (about 12,000–14,000 CALYBP) from sites in the Amazon Basin and southern Chile. Dr. Dillehay reports a dimly visible but possible 30,000 RCYBP occupation horizon at Monte Verde in Chile, a controversial date at this point. He isn't the only one to see dates in this range. Brazilian archaeologist Niède Guidon, director of the Museum Foundation for the study of Man in the Americas (Fundação Museu do Homem Americano, or FUMDHAM), excavating for the past three decades near the Piaui community of São Raimundo Nonato at the painted rockshelter sites of Pedra Furada, Sítio do Meio and over a dozen others, has recorded dates of 14,000 to 50,000 RCYBP. These dates, like Dillehay's, are subject to a great deal of suspicion by an archaeological community still not entirely accepting of anything beyond the Clovis Horizon at 11,500 years before the present.

Much more tangible and at least within range of the accepted 11,500 year Clovis line are human remains from other sites in the area dating as far back as 12,200 RCYBP (about 14,200 CALYBP)—a significant point in time in the continuing search for early New World settlers.

In this report I'll briefly describe the general area of interest, then outline the assemblage of human remains at FUMDHAM, particularly older material that has not been extensively described in English-language literature. I'll place these Paleoindians in the context of controversial dates from lower levels at the rockshelters, then look at where this evidence plays in the long-running discussion of replacement of an older population of relatively long-headed people by more recent groups with shorter, higher heads.

Paleoindians in Northeastern Brazil

by A. Russell Nelson



ALBERT RUSSELL NELSON

An environment like our Southwest

São Raimundo Nonato sits about 1800 ft above sea level in the Brazilian Highlands, at approximately 8° south latitude, in a sandstone and karstic limestone uplift formation. The environment is semiarid desert. The vegetation community—*caatinga*, or thorn forest—would be at home in the Sonoran Basin of Arizona, and although many species are familiar—prickly pears, for example—many, such as the Saguaro-like *mandacaru*, are unfamiliar to my Northern Hemisphere-oriented botany but fill similar niches in this particular desert. There isn't much annual temperature fluctuation, probably 10–15 degrees on either side of 95° F.

The landscape is commanding. Calcareous limestone outcrops give way to the overlying sandstone uplift. Narrow slot canyons cut deeply into 50–70 m of conglomerate-capped sandstone headwall; light filters down into ethereal spaces at the heart of the massif. High overhanging cliff faces provide ideal

localities for rockshelters at their bases. People who have occupied these rockshelters for millennia have decorated the walls with a wide range of figures drawn with characteristic red ocher paint. The area is known for its abundance of rock art from these painted shelters, and it was to examine painted shelters in the late 1960s that Dr. Guidon came from the University at São Paulo.

Guidon saw snapshots at a conference and came to investigate. What she found was a wilderness full of archaeological sites that were virtually untouched and completely unknown. Even now, three decades later, she and her team have excavated only about two dozen of 500 to 600 known sites. Of the sites they have excavated, 10 or 12 have yielded human remains. There are 18 to 20 individuals in the collections at FUMDHAM, including several more recent burials (over the past 350 years) in funerary urn displays.

Of the 18 or so individuals represented in the study collections, at least three date to 9600 RCYBP or earlier (about 11,000 CALYBP), two date to 7000–9,000 RCYBP, and four are fossilized and

haven't yet yielded dates. One individual at about 2,000 years old represents the period of 1,000 to 7,000 years ago; all the rest date to 250 to 1000 years old. The collections are small—the museum has only been in place a few years—but potentially half the human remains date to 7,000–12,000 years old. Either these archaeologists have been remarkably lucky in choosing sites, or there is a high density of Paleoindian sites in the area.

Intriguing finds deserve attention

The site in this area probably best known and most widely described is Toca do Boqueiro do Pedra Furada, situated at the base of a high overhanging wall well above the valley floor and safe from periodic stream flow washout. Guidon has reported dates of 30,000–50,000 RCYBP from its lower levels 4–5 m below the current ground surface. Pedra Furada and surrounding sites present a continuum, where it's hard to distinguish between cultural and faunal evidence of Pleistocene occupations. From the lower levels to those dating to about 14,000 RCYBP (about 16,800 CALYBP), hearths and Oldowan-looking choppers and pebble tools made of local quartzite mark the Pedra Furada tradition. After 14,000 RCYBP, the



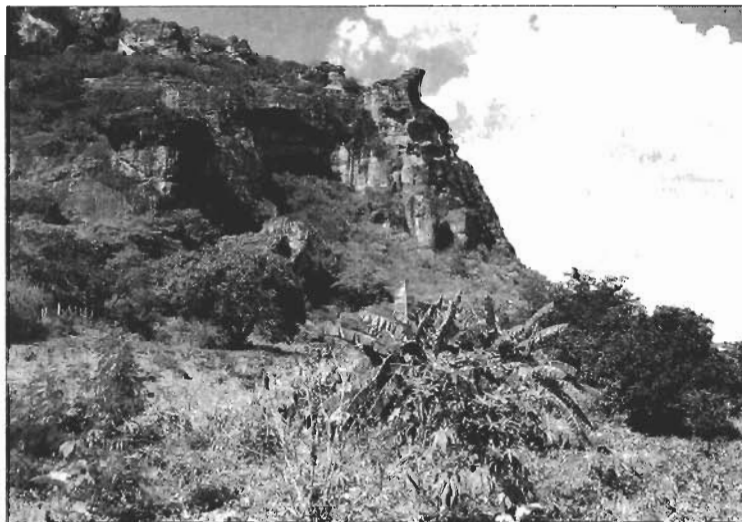
Serra Talhada tradition at Pedra Furada is documented by rock art and tool assemblages unquestionably of human origin. Sítio do Meio, a nearby rockshelter, has also yielded dates of 14,000 RCYBP on material of reliable provenience. Caldeirão do Rodriguez, which sits atop the capstone formation, produced dates in the 18,000 RCYBP range (about 21,500 CALYBP).

Although none of these sites has yielded human skeletal remains, human remains dating to nearly this antiquity have been recovered from other sites



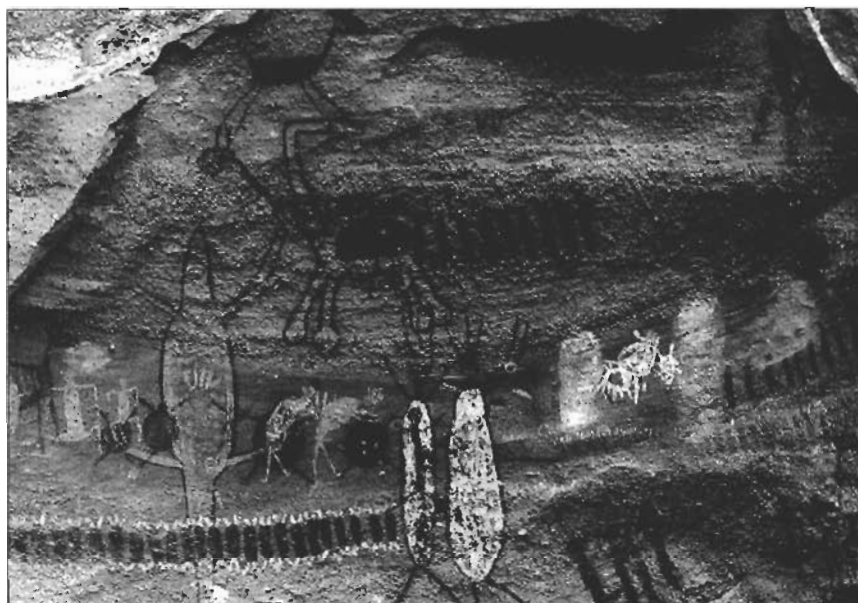
◀ The slot canyon Toca do Inferno. Although no evidence has been found of occupation by prehistoric people, frequent water wash through the heart of the stone massif may have obliterated traces of their presence.

▼ Desert *caatinga*, with cultivated banana plants in the foreground.



Impressive rock paintings like this panel from Pedra Furada date to the Serra Talhada Tradition, from approximately 14,000 CALYBP to European contact.

nearby. At Toca do Garrincho in a karstic cave formation nearby, Guidon's team recovered a mandible fragment and two human teeth. Organic matter apparently associated with the human remains yielded a date of $12,170 \pm 40$ RCYBP (about 14,200 CALYBP). Although organic material, not collagen, was dated, nevertheless this possibly represents the oldest human remains recovered to date in the New World. From our Northern Hemisphere perspective, the Buhl burial from Idaho dated to about 10,700 years, the Spirit Cave and Wizard's Beach burials from Nevada date to about 9400 years, and the controversial Kennewick individual from Washington dates to about 8400 years. These burials are single, isolated individuals. In Brazil, Paleoindian remains seem to be relatively more common. Beyond the relatively famous Lagoa Santa material, approximately a dozen individuals dated to around 10,000 years ago, and the Lapa Vermelha IV ("Luzia") at around 9300 (uncalibrated) also from the Lagoa Santa area, Brazil has produced over a dozen or more Paleoindians from other states around the country. At Toca dos Coqueiros near the Garrincho site in Piauí, a human burial dating to 11,060 RCYBP (about 13,000 CALYBP) was recovered from a rich Pleistocene faunal assemblage; the remains are fragmented but nevertheless some reconstruction was possible when I was there. (The description in *American Journal of Physical Anthropology* (118(2):99–110) by Brazilian anthropologist Andrea Lessa suggests this individual is a female; my examination and reconstruction points to a gracile male.) At the rockshelter of Toca da Janela da Barra do Antonião, a young woman was apparently crushed by rockfall as she lay sleeping near her fire. The skeleton, incomplete but exceptionally well preserved, thanks to burial under the rock, has been radiocarbon dated at 9670 ± 140 RCYBP (about 11,000 CALYBP). Here again is a rich



ALBERT RUSSELL NELSON

Pleistocene faunal assemblage topped by a human interment, this time apparently unintentionally. All these sites lie within a radius of 4–5 km.

In a limestone outcrop with a couple of shelter areas, the twin sites of Barrigudo and Bastiana, being excavated currently, have yielded the remains of seven individuals. So far all have foiled attempts at dating. The remains from Barrigudo, of a 3- to 5-year-old child and a 40-plus-year-old probable male, are so badly leached and degraded there isn't enough collagen left in the entire sample to get a date. Nevertheless, the remains of a ground sloth have been located in some association with these individuals. The material from Bastiana, not 30 m away in the same shelter formation, has undergone complete mineral replacement of the bone—since it's all fossilized, again there's no collagen left for dating. Bastiana has yielded the remains of four individuals, all badly fragmented: two children, ages 3–5 and 9–10; a young woman, age about 15–16; and a probable male, age over 40. Dental morphology and dimensions of the permanent dentition, about the only morphological diagnostic available on these samples, fall well within modern distributions, and the teeth appear to exhibit, to a non-dental specialist,

Dated human remains from sites in the Serra da Capivara (dates corrected for the carbon isotope fraction).

Site	Lab No.	Material dated	Age (RCYBP)	Remarks
Toca dos Coqueiros	Beta 109844	charred material from associated hearth	9870 ± 50^1	burial (m/f?); Darden Hood, pers. comm. (2002)
	Beta 104571	charred material	$10,640 \pm 80$	Darden Hood, pers. comm. (2002)
	Beta 104572	charred material	8870 ± 60	Darden Hood, pers. comm. (2002)
	Beta 84410	charred material	7490 ± 60	Trench 1; Darden Hood, pers. comm. (2002)
Toca da Janela da Barra do Antonião	GIF 8712	not available	9670 ± 140	burial (female); Lessa and Guidon (2002)
Toca do Garrincho	GIF 9335	carbon (charcoal)	$10,020 \pm 290$	Lessa and Guidon (2002)
	Beta 136204-AMS	organic material	$12,170 \pm 40$	Darden Hood, pers. comm. (2002)
	GIF 9333	not available	7410 ± 130	Lessa and Guidon (2002)

¹conventional radiocarbon age

a suite of features common among Amerind and Asiatic people: a variation of the enamel surface of the upper front teeth called maxillary incisor shoveling; small natural pits (not cavities) in the cheek side of the molar teeth called protostylid pits; and enamel tips that peek down between the roots below the gumline on the molars. An extra wrinkle is periodically observed on the forward tongue side of the upper first molars; known as Carabelli's trait, it is not common or well

developed among this sample, but is present on some individuals.

Where in the stream?

The key to interpreting the Pedra Furada dates, of course, is interpreting the tools and the occupation-level hearths from which charcoal was taken for radiocarbon dating. Physical anthropologists note that 50,000-year-old human remains from European sites are of Neanderthal-grade robusticity, but no human remains

remotely approaching this age have ever been found in the New World. At a 30,000-year horizon in Europe we find "modern" humans, as well as sophisticated art at comparative sites. It would be a mistake, however, to assume identical cultural patterns and to expect to find a human culture in South America 30,000 years ago cut to fit a European template. Australopithecines 3 million years ago in Africa had a technology on the level of
continued on page 18

Monograph on Pedra Furada Now Available from French Publisher

Pedra Furada, a huge sandstone rock-shelter in the arid Piauí region of northeast Brazil first explored by Niède Guidon in 1978, has been locked in by nearly 50 valid radiocarbon dates that form a "solid, coherent and remarkably long sequence" from about 6150 to 50,000 years ago, according to Fabio Parenti. He took over the excavations in 1987–1988, then began years of analyzing the finds. The result became his doctoral dissertation—four volumes weighing more than 14 pounds! Paul Bahn from the UK reports that "the fruits of all these investigations are now available to all" in a single 472-page book with accompanying folder, *Le Gisement Quaternaire de Pedra Furada (Piauí, Brésil): Stratigraphie, Chronologie, Evolution Culturelle* ("The Quaternary Layer at Pedra Furada (Piauí, Brazil): Stratigraphy, Chronology, Cultural Evolution").

Dr. Bahn, whose article "50,000-year-old Americans of Pedra Furada" appeared in 1993 in *Nature*, foresees a pivotal role for Dr. Parenti's work in peopling of the Americas studies:

Researchers can at last examine the evidence for themselves, in its newly available form—the author's careful assessment of the work by Guidon, its integration with the results of his own excavations, and the presentation in text, drawings and a few photographs of the site's stratigraphy, layout, features

and artifacts. I believe that only the most hardened Clovis-first diehards will find it difficult to accept Parenti's meticulous and objective approach to the site and its contents, and his modest and limited conclusions.

The six sections of Parenti's opus treat such aspects of the site as regional context, excavations, and archaeological structures. The text (323 pages) is followed by 120 plates, which comprise drawings of principal stratigraphies, features, structures, and lithics of the site. Some 35 of these plates—fold-out maps, drawings, and plastic overlays—are contained in the accompanying 12-by-17-inch folder.

Parenti, who according to Bahn is "fully conscious of the many and varied objections which have been raised to the validity of the site's data over the years," is cautious in evaluating the evidence, especially when ascribing evidence of human presence. "For example, where he is uncertain that a structure is intentional, he says so," Bahn notes, "and where an artificial arrangement of stones does not contain charcoal or traces of burning, he classes it merely as a structure, not as a fireplace." Since no bone or pollen has survived in the sandstone shelter, reconstructing the paleoclimate and subsistence activities has relied on faunal fossils from limestone shelters in

the area and on charcoal, which fortunately has survived at Pedra Furada in considerable quantity—"no less than 13 kg [about 28½ lb] in the Pleistocene layers of one part of Pedra Furada," Bahn notes.

Verified evidence abounds of the hand of early man at Pedra Furada. Bahn cites, for example,

the biggest structure (No. 67), unique to the site, [which] is 6.5 m long and 3 m wide, and made up of 515 pebbles and 102 sandstone blocks, and since it occurs in a zone composed of sand and gravel, it cannot be natural; it is located close to a fireplace dating to 19,300 BP. The structure's function remains a mystery, in view of the total absence of traces of burning.

Parenti confidently rules out natural fires as the origin of charcoal and burned stones found at Pedra Furada. "The region's brush fires never produce heat over 250 degrees Celsius," notes Bahn, "whereas experiments show that the temperatures of these fireplaces were far higher (at least 450 degrees)." Fully aware of criticisms and suspicions that have surrounded Pedra Furada over the years, Parenti builds his case with painstaking detective work and careful science.

Bahn is confident that an English translation will appear in the near future. In the meantime, you can order the French version from the publisher:

e-mail: diffusion@adpf.asso.fr

fax: 011 33 1 43 13 11 25

phone: 011 33 1 43 13 22 83

mail: adpf, service diffusion, 6, rue Ferrus, 75 683 Paris cedex 14, France

Price is 89 (approx. \$87.40 U.S.)+ s&h.



WHAT CAUSED the conflict over Kennewick Man?

Douglas Owsley, physical anthropologist with the Smithsonian Institution and co-plaintiff in the Kennewick Man lawsuit, regrets that an adversarial relationship is perceived between his fellow plaintiffs and tribes who claim repatriation rights over Kennewick Man. "Our legal challenge is not against American Indians," Dr. Owsley writes, "although others frequently characterize it as such. The dispute is based on a federal agency's action."

It was the precipitous haste by that agency, the U.S. Army Corps of Engineers (COE), to transfer the remains of Kennewick Man to the Umatilla Tribe for immediate burial that launched the legal dispute that continues after six years. The well-preserved skeleton, found eroded out of the bank of the Columbia River on land owned by COE, had a Europeanlike appearance and was first thought to be a 19th-century explorer or trapper. When a broken stone projectile point was found lodged in the pelvis, archaeologist James Chatters ordered a radiocarbon-dating test of a metacarpal fragment, which returned a date of 8410 ± 60 RCYBP (about 9320–9510 CALYBP). At that point the COE ordered a halt to further tests (a DNA test was underway at the University of California–Davis) and took possession of the remains. Exercising what they perceived to be their authority under NAGPRA to turn over to Native Americans any remains and "cultural items" found on federal land that can be tribally affiliated, the COE immediately began negotiating with local tribes to transfer the remains.

When the COE announced its intention to transfer the remains to the Umatilla, deemed the affiliated tribe because of the location where the skeleton was found, interested scientists repeatedly requested permission to examine the skeleton. The COE never responded to their requests. Likewise, Owsley's pleas to the Umatilla on behalf of the Smithsonian that he be allowed to examine the skeleton went unanswered.

As a last-ditch measure, eight scientists filed suit in U.S. District Court to halt the transfer and to enforce what they contend is their legal right to study the Kennewick Man skeleton. The lawsuit is the first major legal challenge to the actions of an agency of the federal government in implementing the terms of NAGPRA.

The Native American argument

The Umatilla rest their claim on religious and cultural beliefs. To them, Kennewick Man is "the Ancient One." "From our oral histories," declares Armand Minthorn, religious leader of the Umatilla and chairman of the NAGPRA Review Committee, "we

know that our people have been part of this land since the beginning of time. We do not believe that our people migrated here from another continent, as the scientists do." Sebastian Le Beau, repatriation officer for the Cheyenne River Sioux, states even more unequivocally the Native American argument based on religion and oral tradition, which ignores Darwin and genetics: "We know where we come from. We are the descendants of the Buffalo people. They came from inside the earth after supernatural spirits prepared the world for human kind to live here. If non-Indians choose to believe they evolved from an ape, so be it. I have yet to come across five Lakotas who believe in science and evolution."

Minthorn and Le Beau choose to reject science; nevertheless they benefit from the work of Owsley and other archaeological anthropologists. "The concept of affiliation," Owsley and Richard Jantz (his former professor, now his colleague) write, "is the very heart of this legislation [NAGPRA] because

the Native American tribes requested the return of *their* ancestors. Critical to this request is the implied ability to distinguish between American Indians and other groups who populated North America." Because Owsley and Dr. Jantz, using craniometric analysis, can often estimate biological affiliation with a high degree of confidence, they have spent much of their time over the past decade helping museums and state and federal agencies repatriate skeletons to the most closely related tribal group. As of May 1999, the Smithsonian had deaccessioned and repatriated to 45 Native American groups more than 3,225 sets of human remains and 87,000 archaeological and ethnographic objects; another 3,000 skeletons from north-central U.S. have been repatriated from universities and museums.

The sword can cut in favor of Native Americans, too. All too often in the past scientists have prevented misidentified remains from being repatriated to Native American tribes. The "Sioux Giant" and "Kiowa Horse Thief," for example (MT 16-3, "The Search for Japanese Origins"), both proved to be culturally Native American but biologically white; their identity was found by Steve Owsley, director of the Osteology Laboratory of the Repatriation Office of the Smithsonian (and another former student of Richard Jantz's). In "From Jamestown to Kennewick: An Analogy Based on Early Americans" in CSFA publication *Who Were the First Americans?* Owsley describes how a chance request by the National Park Service prevented the erroneous burial of human remains. Asked to verify the ancestry of five 17th-century skeletons from Jamestown Island, Owsley found they had been mistakenly identified in 1940 as Native American; they were in fact African. Surely the African American community's claims to their ancestors are equally as valid as those of Native Americans.

When Science and Politics Collide

*The second of a 2-part series on
Kennewick Man looks at issues that created
disputes with Native Americans, the federal
government, and other scientists*

Owsley and Jantz are loath to abridge the religious freedom of Native Americans; however, their goodwill stops short of surrendering their rights as scientists. According to Donald Sampson, chairman of the Board of Trustees for the Confederated Tribes of the Umatilla Reservation, scientists' arguments for their right to examine the Kennewick Man remains are "shaky to nonexistent." And here, Owsley and Jantz insist, we're close to the heart of the lawsuit, for the apparent policy of the COE is to favor religion over science. If the policy favors one religion, they ask, will it favor all religions? How will the COE resolve conflicting claims by several religions? How does the public's right to information about our past figure in this dispute?

Censure from other scientists

The scientific community doesn't speak with one voice. In an article titled "Gordon Creek Woman Meets Kennewick Man: New Interpretations and Protocols regarding the Peopling of the Americas" (*American Antiquity*, 64(4), 1999), Alan Swedlund and Duane Anderson take Owsley and Jantz to task for the furor caused by the Kennewick Man discovery and subsequent lawsuit. Indeed, they charge that Owsley, Jantz, and their colleagues have misapplied science, unnecessarily created a rift between scientists and Native Americans, and shamelessly appealed to the public's emotions through sensational coverage on TV and in the print media. Drs. Swedlund and Anderson point to the discovery of Gordon Creek Woman in the Roosevelt National Forest in northern Colorado, about 20 miles south of the famous Lindenmeier Folsom site, as an example of the manner in which an archaeological project involving ancient human remains should be conducted.

Gordon Creek Woman (at first misidentified as a man) is an isolated burial with funerary artifacts; it was discovered in 1963 by a team headed by archaeologist Dave Breternitz and whose members included Anderson, a graduate student at the time. A sample from the left ilium gave an age of 9700 ± 250 RCYBP (about 11,100 CALYBP). The bones of the skeleton were fragmentary, and most of the long bones were incomplete; the skull was painstakingly reconstructed from 39 fragments. Breternitz, Swedlund, and Anderson's report, "An Early Burial from Gordon Creek, Colorado," in *American Antiquity*, 36(2), 1971, is a detailed description of artifacts, faunal material, and burial context. They summarize the morphology in a list of measurements made of the skeleton (including eight of the reconstructed cranium); describe their inferences about the



CHIP CLARK, NMNH, SMITHSONIAN INST.

Owsley excavates the burial of a 17th-century colonist on Jamestown Island, Virginia.

living subject (age 25–30 years; height 149.5 cm, or about 4-feet-10½; well-developed muscular processes; short, small bones); and briefly describe discernible pathologies, mostly pertaining to dentition.

That pretty much summarizes the history of Gordon Creek Woman. Her remains are curated in the University of Colorado Museum, and she has escaped public notice for many years.

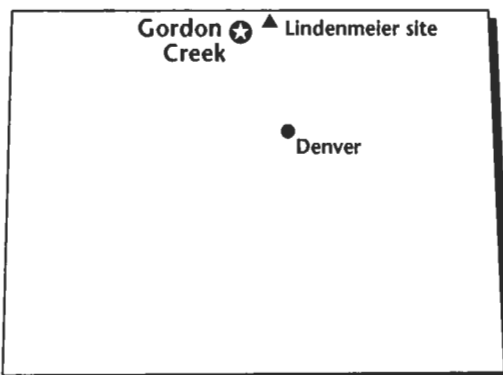
Could Kennewick Man have been resolved amicably?

In their 1999 *American Antiquity* article, Swedlund and Anderson note (ruefully?) that "Gordon Creek Woman has been cited in very few archaeological publications." What is apparently most important to them is that the discovery didn't rock any boats, didn't foment ill will between

scientists and Native Americans—contrasted with the hostility that surrounds Kennewick Man, they point out. "Kennewick Man appears to us," they assert, "to be a lesson—and not a particularly good one—in the problematics of interpretation and protocol. From the outset it would appear from the reporting that the discussions between American Indian representatives from the region and researchers were hostile, opinions on both sides were quickly formed, and a tone of compromise and conciliation was not in evidence."

Owsley and Jantz responded to Swedlund and Anderson's charges in their own article, "Archaeological Politics and Public Interest in Paleoamerican Studies: Lessons from Gordon Creek Woman and Kennewick Man," published in *American Antiquity*, 66(4), 2001. They recount patiently the chronology of events that led to the plaintiffs' filing a lawsuit, and they cite Jelderks's own assessment of the situation: "Had the plaintiffs not filed this lawsuit when they did, it appears from the documents before this court that the remains would already have been turned over to the Umatilla tribe or perhaps to another Native American tribe."

The life of the archaeologist was unquestionably simpler in the pre-NAGPRA environment of 1963. Before investigating the Gordon Creek burial, Dr. Breternitz merely needed a permit from the U.S. Department of Agriculture, Forest Service, under the provisions of the Antiquities Act. In their 1999 *American Antiquity* article, Swedlund and Anderson concede that in 1963 there were "no established protocols for timely notification of interested groups." They confess that "it



never occurred to us to conscientiously share our feelings with the American Indian community and invite consultation. Had we had the foresight to do so, we might have found ourselves in a more positive set of professional and public relationships today." Their altruistic attitude is commendable, though totally unrealistic in a situation like the one Owsley, Jantz, and their co-plaintiffs find themselves in, as revealed by this blithe statement: "We would hope that if Gordon Creek woman were to be discovered today that bioarchaeologists, in consultation with American Indian scholars and tribal leaders, could jointly study the remains, arrive at their respective interpretations, and conduct their respective scientific and cultural practices in an environment of mutual respect." Before this utopian state can ever be realized, of course, goodwill and reason must emanate from *both* parties.

The issue of bad press

Outrage and indignation characterize Swedlund and Anderson's reaction to the publicity given to Kennewick Man. They point out that "unlike previous scientific discoveries of early humans in North America, discussion and debate of the evidence for Kennewick Man has been presented almost exclusively in nonscientific media or through commentaries in newsletters and scientific journals."

Well, Kennewick Man *was* news. Reporters hungry for news are quick to pounce on headline-worthy material, and discovery of a 9,300-year-old skeleton in the Pacific Northwest ranks up there with the latest gossip on Monica Lewinsky. Once the coroner's office let the cat out of the bag—a decision made without the knowledge or consent of Owsley or Jantz or their co-plaintiffs—the popular press treated the news according to their standards, which at times admittedly lacked accuracy and taste. As for Owsley and Jantz, they

Sorting commingled human remains in Cadiz, Spain.

write that "in talking with the press, all of us have worked hard to maintain scientific integrity while presenting information in a 'general public' format." And it must be noted that not all the coverage has been shallow and unsatisfactory. "Nova," the outstanding science-for-the-public program on the Public Broadcasting System, aired a thoughtful presentation of the issues involved in the discovery of Kennewick Man and subsequent lawsuit.

Is it necessary to remind Swedlund and Anderson that before Owsley and Jantz can discuss Kennewick Man in *scientific* media, they must first be allowed to examine the skeleton? That, after all, is what the lawsuit is all about.

Invoking the dread "R" word

The accusation that surely cuts most painfully is that Owsley, Jantz, and Dr. Chatters, in an effort to attract public attention, stooped to racial stereotyping. Chatters is the anthropologist from nearby Richland, Wash., who was the first to inspect the skeleton after it was found by two men viewing a boat race on the Columbia River. Asked for his impression of the skeleton, Chatters reportedly said that "on the physical characteristics alone, he could fit on the streets of Stockholm without causing any kind of notice." After he and other scientists applied the term "Caucasoid" to describe the skull, some reporters in a feat of inexactitude published the startling news that the skeleton of an ancient Caucasian had been unearthed.

For Swedlund and Anderson there is "something very anachronistic about the racialized, typological characterization of human variation that we find disturbing." They name other scientists—Anderson et al., Goodman, and Marks—who are equally offended that Chatters and others would "ascribe

decontextualized, biological race to an isolated skull based on qualitative and somewhat subjective features." Judging by their outrage, Chatters's statement is on a par with endorsing Hitlerite tests for Aryanism.

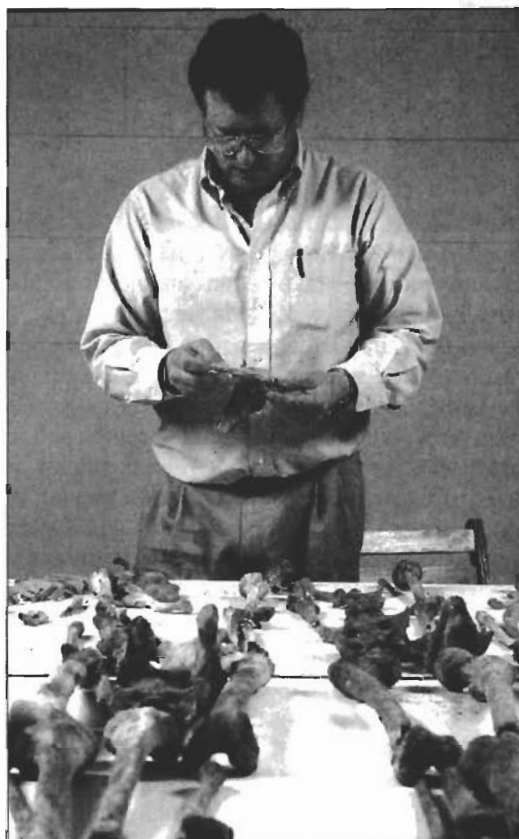
The fundamental fact that underlies the Kennewick Man lawsuit—a fact that makes studying his remains crucial to our understanding of the peopling of the Americas, a fact that Swedlund and Anderson cannot accept—is that *Kennewick Man is different from any Native American in the Northwest today.*

He looks different. His skeleton was brought into the local coroner's office without provenience and without clues about his nationality. Until the stone point in his pelvis was noticed, his skeleton was judged to be that of a historic-age European *by scientists trained in comparative anthropology.* Catherine J. MacMillan of Bone-Apart Agency in Ellensburg, Wash. (professor emeritus at Central Washington State University), wrote to the coroner, "I was stunned when I examined

the pelvic bone and the projectile point associated with it." Nevertheless, after reexamining the skull, Dr. MacMillan confirmed her original assessment, "Caucasian male" (of course, this was before the radiocarbon-dating results were known).

Likewise, Grover Z. Krantz, physical anthropologist at Washington State University, said after studying the skeleton for an hour, "The skeleton would be almost impossible to match among any of the western American Indian tribes." Dr. Krantz believes NAGPRA has no more applicability to the skeleton than to the remains of a Chinese left behind by an ancient expedition.

Under the circumstances, how should Chatters have described the skeleton? Certainly members of the popular press



CHIP CLARKE, NAGPRA, SMITHSONIAN INST.



wouldn't have been satisfied with a description in scientific terms: *Cranial vault narrow and relatively long with facial features that include small malars, a narrow facial width, a prominent nose, and a projecting chin.* Instead, Chatters described Kennewick Man's appearance in the most racially inoffensive manner he could think of, "He could fit on the streets of Stockholm without causing any kind of notice." Can Swedlund and Anderson improve on his description, understandable by any layman?

What was found at Gordon Creek?

It is the perceived Europeanlike characteristics of Kennewick Man that most seem to trouble Swedlund and Anderson. That's why they are also uncomfortable with the results of studies by D. Gentry Steele and Joseph Powell, who have applied craniometric analysis to Paleoamerican skeletons and come to the conclusion that where they differed "from modern northern Asians, they tended to structurally resemble southern Asians and European populations." Swedlund and Anderson brush aside Steele and Powell's conclusions with cool disdain: "The fact that a few Paleoindian examples from North America can be associated with North Asian, South Asian, and European populations using a battery of different statistical approaches is, in itself, interesting." (What a carefully chosen word, *interesting*.)

It is patently manifest that Swedlund and Anderson don't put stock in craniometric analysis. It's puzzling, therefore, why in the course of their 1963 investigations of the Gordon Creek Woman, after reconstructing the skull they took eight cranial measurements and noted that "evidence of dolichocephaly is lacking." (Recall that most Paleolithic skulls are long-headed, or dolichocephalic; Swedlund and Anderson's measurements show that Gordon Creek Woman is mesocephalic, or "medium-headed"; the ratio of breadth:length, 0.798, falls between the values for dolichocephaly and brachycephaly.) In their original report in 1971, they also observe that skulls of several other early-Holocene skeletons (from the Marmes rockshelter in Washington and sites in Mexico) are either brachycephalic or mesocephalic. Having noted this curious coincidence, they say no more about it.

Doug Owsley has more to say about Gordon Creek Woman. "When you look at these early skulls," he tells us, "one of their hallmarks is a very short face, compared with those of the historic period." What does he mean by a short face? If you put your index finger at the indentation between your eyes and your thumb on your upper lip, that's the distance from the top of the nasal bone (nasion) to the prosthion, called the midfacial height. Early skulls, compared with the world population, tend to have short faces and long, relatively narrow cranial vaults.

In contrast, the midface height of a contemporary Native American (allowing for variability among individuals) tends to be long, the cranium short and broad. "When our scientific critics dismiss an ancient skull as American Indian," says Owsley, "I ask myself, What can we identify that makes an Indian? One of the key features is that long face."

Gordon Creek Woman has a short face.

Owsley and Jantz didn't stop with this observation. In their *American Antiquity* article they describe how they performed a craniometric analysis on Gordon Creek Woman, using six of the


cranial measurements given in Swedlund and Anderson's 1971 article. The skull was compared with each of seven groups from worldwide populations; in each comparison it was treated exactly like others in the group. One by one each specimen, including Gordon Creek Woman, was removed from the group and its Mahalanobis distance (a measure of the genetic distance of the subject) from the group was measured.

When the results are tabulated, the implications are startling.

Group	Mahalanobis D ²	Rank	Nonpar. P	Para. P
Europe	7.164	48/154	.3117	.3380
SW Pacific	9.437	7/146	.0479	.1800
Africa	10.157	21/149	.1409	.1446
East Asia	12.655	11/130	.0846	.0691
Polynesia	15.848	4/165	.0242	.0222
Plains	20.483	2/134	.0149	.0046
Great Basin	20.999	1/26	.0385	.0477

Whether Swedlund and Anderson like it or not, Gordon Creek Woman, the 11,100-year-old skeleton discovered 39 years ago, is most similar morphologically to the European population group (smallest Mahalanobis distance, corresponding to the least genetic distance) and *least similar to modern Indians of the Plains and Great Basin*. The rank, a measure of the distinctiveness of Gordon Creek Woman in each group of number *n*, shows that she would be the *most* exceptional of 26 Great Basin Indians and that *only one* Plains Indian would be *more* exceptional. (The nonparametric probability of the Gordon Creek Woman's belonging in each group is rank/*n*; the parametric probability is a measure of the typicality probability of her skull's falling within the range of each modern population.)

What is at stake?

Like Kennewick Man, Gordon Creek Woman is *different* from today's Native Americans. The reason is shrouded in mystery. Owsley and Jantz want the opportunity for themselves and experts in other disciplines to solve that mystery. "It isn't that I need another skeleton," says Owsley, "or that I'm hot to get in there for my personal gain. I work for a federal agency, the Smithsonian Institution. Having been around for as many years as I have, if I'm denied access to that skeleton, it means that some student working today toward a doctorate or an assistant professor doing research isn't going to have a prayer." 

—JMC

How to contact the principals of this article:

Douglas W. Owsley
Department of Anthropology, Smithsonian Institution
P.O. Box 37012
NHB, Room 345, MRC 112
Washington, DC 20013-7012
e-mail: owsley.douglas@nmnh.si.edu

Richard L. Jantz
Department of Anthropology, University of Tennessee
250 South Stadium Hall
Knoxville, TN 37996-0720
e-mail: rjantz@utk.edu

Shedding Dead Weight of the Past



EVERY SCHOOLCHILD LEARNS that the body of science grows because each generation of scientists builds on the work of past masters. If he could see farther, the great German mathematician Gauss acknowledged, it was because he stood on the shoulders of giants. But progress is impeded if we fail to recognize and discard flawed science, and flawed science is unfortunately what Franz Boas bequeathed us.

This German-born physicist, mathematician, and geographer is deservedly called the father of American anthropology. His discoveries, made over the span of half a century, form the basis of studies today in cultural and physical anthropology. Fame carries a price, though. It is because of his formidable reputation that many members of the scientific community continue to support a study he did early in the 20th century, where he made three measurements of the heads of American-born children, compared them with those of their European immigrant parents, and detected significant differences. Having demonstrated to his satisfaction that a radical change in environment can substantially change the human skull in just one generation, Boas declared skull shape so dependent on environmental pressures that we cannot hope to deduce from it reliable information about human ancestry, origins, and population movements.

The results of this milestone study by the great Franz Boas have been accepted at face value by generations of anthropologists. Sadly, support for his conclusions about the plasticity of the human skull has stifled the growth of craniometric analysis. It's true that forward-thinking scientists around the world recognize craniometric analysis as a valid and valuable procedure and consider it as useful as analyzing DNA and blood and serum protein in determining human lineage; in fact, some authorities believe it is an especially incisive tool, like language studies, that

can tell us more about human origins than we can learn from blurred genetic data. Nonetheless, many scientists continue to view craniometric analysis with suspicion on account of Boas's 90-year-old study. It's hard to believe that Boas, whose liberal views on racial prejudice and whose opposition to eugenics put him in a class with a few enlightened savants of his day, would be pleased to know that his single study has deprived craniometric analysis of a fair hearing.

Putting the Boas study to the test

"A modern critique of Boas's original study has been long overdue and is pursued herein using modern genetic and statistical methods." So begins the second paragraph of the abstract of Corey Sparks's master's thesis, completed in August 2001.

Sparks, then a graduate student in anthropology at the University of Tennessee, took on as a research project (with encouragement from Richard Jantz, his thesis director

Disproving a classic study by a great scientist pumps new energy into studies of human origins.

and an outspoken advocate of craniometric analysis) the task of scrutinizing Boas's study.

Starting with Boas's original data—15,000 measurements of



Franz Boas (1858–1942), who made extensive studies of Indian tribes in America and Canada, even took part in an Arctic expedition in 1883–1884. His enormous range of interests included language, culture, folklore, and just about every conceivable aspect of society affected by race and people's attitudes toward it.

the crania of immigrants and their American-born children!—Sparks designed programs to analyze the data while applying rigorous statistical practices. His analysis subjects the raw data to the scrupulous combing and screening any careful scientist would apply today, and which Boas, who has a reputation for exacting critical standards, curiously failed to apply in this instance. Sparks notes that the original study is “very uncharacteristic of Boas. He does no statistical analysis whatsoever. Five years before he did this study, he was a completely different researcher. This study is quite different from work he had done in the past.”

An unusual study by a complex researcher

Both Boas the man and the circumstances of his study, begun in 1909, are cloaked in mystery. Some years earlier he had published a paper (one of 600 he wrote in his career) that promoted skull shape as a reliable indicator of racial differences and of trends in heritability. In connection with the 1893 World's Columbian Exposition in Chicago, Boas enlisted workers to take measurements of Indians throughout America and Canada; it was a huge project that would only have been undertaken by a scientist with great faith in anthropometry.

Subsequently he seems to have suffered a failure of confidence in craniometrics. Perhaps it was an emotional response to his loathing of race prejudice, which can feed on theories of racial typology. Some scientists—and pseudo-scientists—of his time first interpreted cranial capacity as a direct measure of human intelligence, then adopted the cephalic index, the ratio of cranial breadth to length, as a more convenient indicator, in part because it can be measured on living specimens (and in part because Negroid skulls tend to be long and narrow, which nicely fit expectations). Whatever his reasons for distancing himself from craniometrics, Boas, after being appointed curator of the American Museum of Natural History in 1901, started planning a research study of the expanding immigrant population of New York City.

Wholesale measurements began in 1909, when, with the help of trained assistants, he measured children in schools around New York City and followed up with measurements of their parents at home. The subjects were Hebrews, Bohemians, Sicilians, Italians, Poles, Hungarian/Slovakians, and Scots. “In what must have been a massive computational undertaking,” as Sparks describes Boas's labors, the enormous quantities of data were processed and tabulated. The results were presented in 1909–1910 in a series of reports to the United States Immigration Commission (whose interest in Boas's conclusions leads us to suspect that the study was undertaken for ulterior motives, perhaps laudable but nonscientific nevertheless) and published in 1912 by Columbia University, where Boas held a professor's chair from 1899 until 1937.

Results of the Boas study

Boas measured the length and width of each subject's head, and from these computed the cephalic index. He also measured the width of the face and the subject's height and weight.

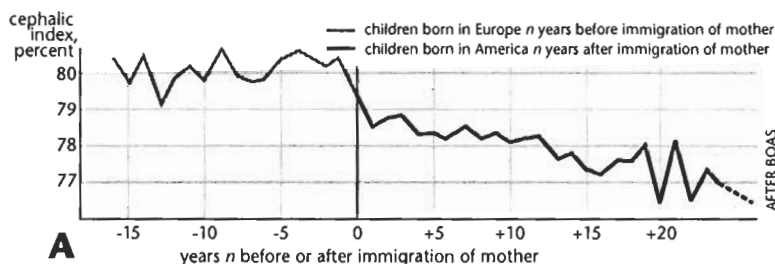
Taking each immigrant group (Hebrews, Bohemians, etc.) as a separate segment, he computed the change in measure-

ments of children born in the U.S. of immigrant parents compared with those of immigrants born in Europe. Here are the results of his skull measurements for the Hebrew segment, published in his paper “Changes in Bodily Form of Descendants of Immigrants.”

	length of head mm.	width of head mm.	cephalic index percent	width of face mm.
males	+2.2	-1.8	-2.0	-1.1
females	+1.9	-2.0	-2.0	-1.3

For other segments he reports changes of approximately the same magnitude, although in some segments the changes are in the opposite direction; for example, in children of immigrant Sicilian and Italian parents the length of the head decreased, the width increased, and the cephalic index increased. Boas considers this bidirectional change in measurements corroborating evidence, since in his opinion it verifies the objectivity of the data gatherers. “It is well known,” he admits, “that an expected result may influence an observation.” However, in his study he notes that “the results among various types lie in different directions; the observers did not know what to expect.”

Boas declares that not only do the skulls of American-born descendants of immigrants differ from those of their parents, “the influence of the American environment makes itself felt with increasing intensity, according to the time elapsed between the arrival of the mother and the birth of the child.” In support of this statement he offers graph **A** showing the change over time in the average value of the cephalic index of Hebrew children born in Europe and in America.



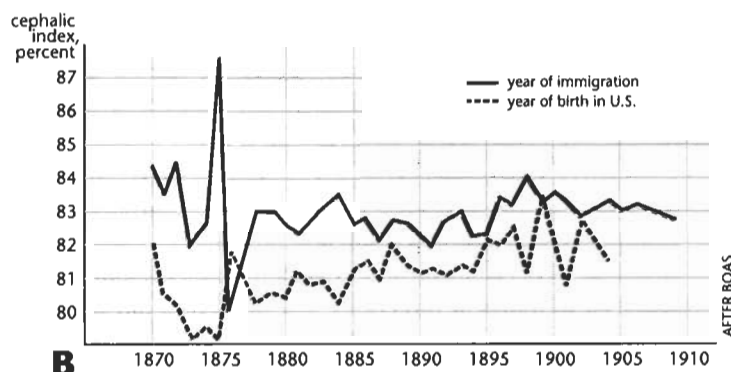
Boas anticipates that critics would question the validity of his findings, since the subjects immigrated at different periods; if the foreign populations from which immigrants were drawn changed over time, then apparent changes in the children might be manifestations of change in the immigrant stock itself. To allay such concerns, Boas compares the cephalic index of immigrants' children who were born in Europe in a given year with that of American-born children whose mothers immigrated in the same year. He is satisfied that the results confirm the differences in his study. (Graph **B** shows his comparisons for the Hebrew group.)

Boas's conclusions are accepted nearly as widely today as when they were first published:

- American-born descendants of immigrants differ in type from their European-born parents, and the difference varies by magnitude and direction between populations.
- The effect of the American environment makes itself felt

with increasing intensity according to the time elapsed between the arrival of the mother and the birth of the child.

- There exists a difference in the parental races (Hebrew and Sicilian) in Europe, but their American-born children do not exhibit this difference.
- American-born children exhibit a dramatic increase in stature compared with their European-born brethren, and this difference varies with family size in that larger families tend to have shorter children.



The results of this classic study were—and largely still are—considered unequivocal evidence of cranial and bodily plasticity. A consequence that must have pleased Boas was the toppling of the established concept of race, for he was confident he had shown that the cranial index, once thought a distinctive feature of the major human races, changed substantially between European-born parents and their American-born children and was therefore meaningless in studies of human origins.

Revisiting Boas's study

Race isn't a dirty word to anthropologists today, and craniometric analysis is a legitimate tool for exploring human ancestry. Boas stands in the way of these statements being accepted as truths.

Before setting out to analyze Boas's study, Corey Sparks found he wasn't the first to question Boas's findings. In 1939 H. L. Shapiro studied differences between the Japanese homeland population and Japanese immigrants living in Hawaii. Although the scale of his study was smaller than Boas's, he measured many more anthropometric variables than Boas did; his study found significant changes in stature and facial height, but little change in the length and breadth of the cranium and bizygomatic breadth (facial width). A similar study in 1943 by M. S. Goldstein, investigating the effects of the environment on Mexican immigrants to the U.S., found changes in stature comparable to those noted by Boas but little or no change in cranial dimensions between the Mexican population and American-born children. Likewise, G. W. Lasker in 1946 observed significant changes between American-born and immigrant Chinese in some dimensions (stature, nasal height, arm span, foot length) but no significant change in cranial measurements.

Although many scientists have produced results that cast

doubt on Boas's conclusions, no one ever took the time to critique his study—to look under the hood, you might say, and check the engine. No one, that is, until Corey Sparks.

Sparks realized early in his project, before he started designing the program that would test Boas's data (and before undertaking the enormous task of sitting at the keyboard and entering all those data into computer memory), that the concept he would be testing is heritability. Each of us is in anthropological terms a *phenotype*, a composite of all the traits that define height, weight, blood type, shape of the skull, color of hair and skin—in other words, everything that makes a unique human being. The question is, How much of what we are is inherited from our parents, and how much is influenced by our environment? The inherited traits constitute the *genotype*, the genetically determined characteristics we inherit from our parents, which are unaffected by life style and surroundings and are only subject to change by mutation.

In mathematical terms (and sophisticated statistical analysis is the only method that can test the validity of Boas's study), we can express the variation measured in a subject as V_P , the total phenotypic variance; the proportion of the variance attributable to additive genetic effects, the genotypic variance, as V_A ; and the random environmental component as V_E . Then

$$V_P = V_A + V_E$$

Of the total change in skull shape—the phenotypic variance—Boas measured in his subjects, Sparks's task was to determine how much of the change was due to genotypic variance. This proportion is called the *heritability* of the trait, h^2 , and

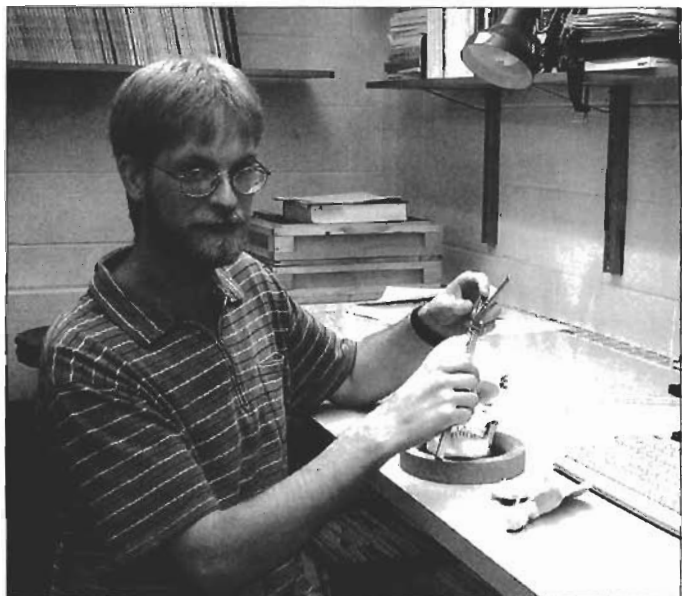
$$h^2 = \frac{V_A}{V_A + V_E} = \frac{V_A}{V_P}$$

"The heritability of a trait," Sparks explains, "is often thought of as the degree of resemblance between parents and their offspring." It's a dimensionless number whose value ranges from 0 to 1. Heritability of 0 means a trait is strictly controlled by the environment; heritability of 1 means it is strictly genetic. If we're trying to establish that a trait is traceable back through generations—genetically determined and not subject to the vagaries of the environment—then we're looking for a value of heritability as great as possible. The closer to 1, the better.

Researchers in recent years, using various techniques to analyze data, have scored reassuringly high values of heritability for traits. C. Susanne in studies of Belgian families in 1975 and 1977 found heritability values of about 0.5 for head dimensions and nearly 0.8 for other body dimensions. Other researchers have devised analytical techniques that incorporate information on pedigrees (family relationships that affect the transmissibility of heritable traits), which make it possible to estimate the heritability of multiple traits. Sparks undertook his project confident in the knowledge that others had laid the groundwork. "It is evident from a number of studies," he notes, "that heritabilities of cranio-facial traits are rather homogeneous and range from .3 to .6. This indicates a significant contribution of genetics in the expression of the cranio-facial phenotype."

Critiquing Boas's study—the method

Boas would envy Sparks for the immensely powerful tools at his disposal for sorting and analyzing enormous quantities of data. Sparks's computer program relies largely on sophisticated matrix-transformation techniques to operate on the data and to correct anomalies in the raw data that can introduce errors in the results.



Corey Sparks.

How well did Sparks do his job? He summarized his project in a 3-by-5-ft poster, which he submitted at the annual meeting last April of the Human Biology Association, an international group of human biologists whose interests encompass everything from human disease and demography to anthropology (even craniometric analysis). His poster was awarded the first prize. "I formulated a pretty decent research design and analyzed the data using modern statistical and genetic techniques," says Sparks matter-of-factly. "It turned out Boas wasn't as right as he thought he was. The judges thought so, too. They told me my research design was correct and my conclusions were valid."

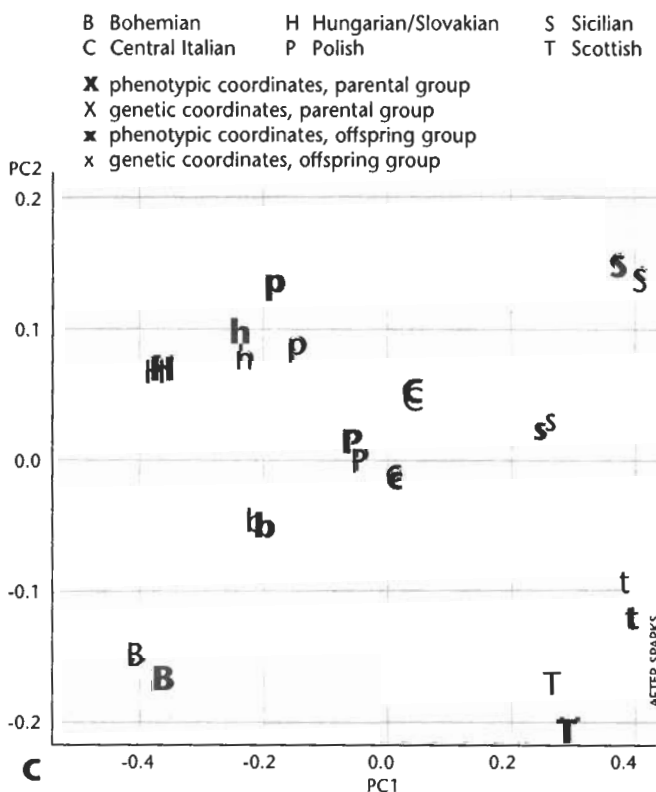
Following is an overview of the analytical methods used in Sparks's program. For an exhaustive description of his methods, check his Web site www.personal.psu.edu/css186; under "My Interests" are links to his M.A. thesis (in Adobe Acrobat format) and to an image of his award-winning poster.

Correcting for anomalies in raw data Sparks took care to eliminate questionable data that might contribute to misleading results. For example, Boas's data listed many families with only one parent or with no parents; Sparks eliminated subjects from these families from his analysis. Likewise, any subject with missing values for any cranial dimension was also eliminated. Throughout his project Sparks exercised the care that Boas is famous for, but which he failed to apply in his milestone study.

Smithsonian anthropologist Douglas Owsley ("When Science and Politics Collide," *MT* 17-3 and this issue) believes Boas's indiscriminate grouping of test subjects of widely varying ages may be the single most important factor capable of

skewing the results of his study. As far back as 1936, Morant and Samson noted that Boas pooled individuals of different ages in order to obtain sufficiently large sample sizes for comparisons. Dr. Owsley points out that since we're dealing with craniometrics, this can subvert Boas's entire study because the human skull undergoes dramatic changes in dimensions and proportions from infancy, through childhood and puberty, into adulthood. In Sparks's program, before analysis the three traits under scrutiny—head length, head breadth, and bizygomatic breadth—were mean-centered by age (to correct for the effects of growth) and by sex (to correct for the effects of any existing dimorphism). Subjects were pooled into yearly intervals up to age 20, then into young (20–39), middle-aged (40–59), and old (60+). Sparks was careful to pool data only across subpopulations in order to preserve morphological differences between regional populations.

Comparing groups To create a graphic representation of the actual distance between groups—the American-born children and the parents of each European population—Sparks's program uses techniques developed over the past decade by pioneers in anthropological research, including methods used to analyze anthropometric traits from Native American data collected by Boas. Maximum likelihood values (best statistical estimates) were computed for the three traits and for phenotypic and genotypic variance components for each group; phenotypic covariances among pedigree members were factored into the results, another refinement that is absent from Boas's study. From these results the mean values for immigrant parent and American-born offspring groups were computed and plotted on Cartesian coordinates. When the groups are superimposed (graph C), the significance of Sparks's findings is instantly obvious:



- The genotypic and phenotypic pairs for each immigrant group and each offspring group very nearly coincide, showing that there is very little environmental component present in the groups under study.
- Immigrant parent and American-born offspring groups lie comfortably close to each other for the three traits under scrutiny. For each of six ethnic groups in Boas's study, Sparks identified the European-born and American-born components, making a total of 12 groups (6 ethnic groups, each with 2 birthplaces). *Of the phenotypic variation among all 12 groups, 99.75 percent is accounted for by ethnicity and less than 1 percent by birthplace.* Contrary to Boas's conclusions, a change of environment has little effect on skull shape in descendants. Dr. Jantz summarizes it nicely: "Sicilians hang together, no matter where they're born."

Computing heritability In order to quantify the effect of the environment on the skull shape of American-born children of European immigrants, Sparks first conducted a series of t-tests, which test for differences in univariate means—tests "Boas would have used in his original study if the computational facilities had been available," Sparks notes. The tests compared the mean values of the traits (head length, head breadth, and bizygomatic breadth) for American- and European-born male and female subjects of the same age. In all, 177 tests were run, and they show minimal differences between the two groups. At a significance level of .05, there were fewer significant tests than you would expect from chance alone. Even at a significance level of .001, only 2 percent of female differences and 1 percent of all tests were significant, confirming extremely low levels of differentiation between European- and American-born children—quite the opposite of what we would expect if Boas's findings were true.


Results of linear regression to test the effect of environmental exposure over time on the cranial index of immigrants' children show no significant effects in any sub-samples, in contrast to the large effect Boas claims to have found. Likewise, Sparks's analysis of variance detects no significant differences between European-born parents and American-born children, either when considered as a whole or when analyzed separately by sex.

What value can we assign to heritability? In his study, which benefits from a large effective population and large, very complete pedigrees, Sparks is confident that the average heritability represents 65.3 percent of the variance in the phenotype—in other words, $h^2 = .653$. This agrees with the high degree of heritability found by Susanne and other researchers, and it confirms that cranial measurements are a trustworthy proxy for genetic data in reconstructing prehistoric and historic population relationships.

Is the skull plastic, after all?

It may seem contradictory to note as an afterword that both Sparks and Jantz have found evidence that the human skull shape is in fact changing. But their findings don't vindicate Boas. The changes they have found are of a different scale from Boas's conclusions and carry implications he probably never dreamed of.

When Sparks performed regression analyses to test the effect of environmental exposure on the cranial index, he made an incidental discovery in Boas's data, the presence of a secular trend in European immigrant groups. The facial breadth of



3rd International
MAMMOTH
Conference ■ Dawson City, Yukon, Canada
May 24–29, 2003

This first International Mammoth Conference to be held outside Europe, sponsored by Heritage Resources, Yukon Department of Business, Tourism and Culture, will concentrate on themes that take advantage of its venue in the far north, at the crossroads of the Old and New Worlds:

- Evolution and phylogeny
- Ecology and physiology
- Indicators of Late Quaternary climate change
- Special preservation of remains in the Arctic/Subarctic
- Mammoth faunas

Contributions are invited for oral presentations and posters on these themes. Papers based on new methods of analysis, including molecular research, permafrost preservation, and late Quaternary climate change in the Arctic/Subarctic, are especially encouraged.

Preliminary program

- Sat, May 24** Arrival in Whitehorse by 6 PM; evening reception and registration at Yukon Beringia Interpretive Centre, Whitehorse.
- Sun, May 25** Trip by bus (or own vehicle) to Dawson City.
- Mon, May 26** Opening ceremony and oral presentations.
- Tues, May 27** Oral presentations and poster session.
- Wed, May 28** Excursion to the Klondike Goldfields.
- Thurs, May 29** Oral presentations and announcement of 4th International Mammoth Conference.
- Fri, May 30** Bus to Whitehorse; departure May 31 or later.

For information:

Beth King e-mail beth.king@gov.yk.ca
phone 1-867-667-5386; fax 1-867-667-8023

John Storer e-mail jstorer@gov.yk.ca
phone 1-867-667-8089; fax 1-867-667-8007


www.yukonmuseums.ca/mammoth/firstcir.htm

males and females became narrower over time, females with a slightly greater average difference than males. The heads of European males and females also became narrower over time, females again to a greater degree than males.

Jantz has detected a similar trend in Americans, both White and Black, male and female, over the past 150 years, which he describes in "Secular Change

in the drastic change in the environment we now find ourselves in." He notes that the environment in North America is unparalleled in the whole history of our species. Several factors at work are nutrition, activity, and infant mortality. "There has never before been a time in our history when over-nutrition was a bigger problem than under-nutrition," he says, "or when we worked as little as we do." Infant mor-

ment to produce it. "Kennewick Man, Spirit Cave Man, Buhl, and other Americans had very similar circumstances to deal with," he stresses. "You wouldn't get much cranial plasticity because of environmental change." Thus he restates the legitimate role of craniometric analysis in studies of early humans, especially as it applies to our search for the first Americans—and to the Kennewick Man lawsuit, of which he is a co-plaintiff.

What of Corey Sparks, who proved the validity of craniometrics as a proxy for genetic data in studying human origins? Today he's a doctoral student in anthropology and demography at Penn State, looking at another six months of field work studying a medieval Danish skeletal population. Asked how long it took him at the keyboard to enter all that data for the Boas study, he guessed, "Oh, about six months. I'd key for six hours or so at a time, then had to drop it for a while." Which begs what seems to be a reasonable question: Why couldn't they have assigned a minimum-wage worker to do it? "That was *me*," he replied. "I was on a graduate-student stipend, and that's pretty much minimum wage."  -JMC

-JMC

THIS BOOK WILL CHALLENGE *your assumptions.*

Beringia Never Happened.

North African man fled the dry Sahara to Europe and to South America in reed boats. No Asians ever entered America by walking south through 3,000 miles of ice.

The Asteroid.

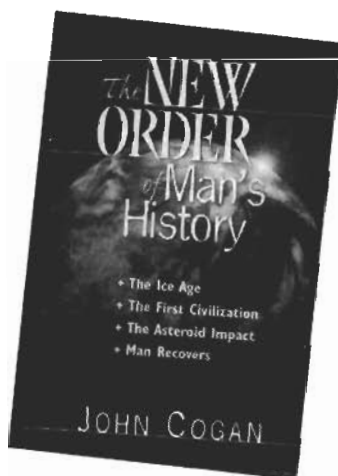
At 10,500 B.P. an asteroid hit the North Atlantic Ocean. The worldwide flood legends recall this event. The Camp Century Greenland Ice Core proves it happened.

The Great Extinction.

The asteroid impact destroyed the ozone layer and hard ultraviolet solar radiation sterilized the large open country animals and birds. Seventy percent of such species became extinct worldwide.

Humans Recover.

The asteroid plunged man into the retrogressive Mesolithic Age 10,500 to 5,000 B.P. Then, four civilizations appear suddenly, spontaneously, in full flower, without historical buildup. Humans have recovered, and conventional history begins.



How to Order:

Send \$22 to New Order Press
P.O. Box 2454
Woodinville, WA 98072
Shipping included.

Washington residents add \$1.90 sales tax.
Also available through Amazon.com.

in Craniofacial Morphology," copublished with Lee Meadows Jantz. Drawing on data in the forensic anthropology database, he found significant changes in the size and shape of the cranial vault of all groups; vault height has increased over time, and the vault has become narrower and longer. The American face has also been changing, although to a lesser degree than the vault, becoming narrower and higher.

This may sound like a good case in support of Boas's argument for cranial plasticity, but Jantz doesn't think so. "We don't know why these changes have occurred," he says. "We're safe in saying, I believe, that these changes are bound up

in the drastic change in the environment we now find ourselves in." He notes that the environment in North America is unparalleled in the whole history of our species. Several factors at work are nutrition, activity, and infant mortality. "There has never before been a time in our history when over-nutrition was a bigger problem than under-nutrition," he says, "or when we worked as little as we do." Infant mor-

tal has also experienced an enormous change. "In the 19th century," Jantz notes, "it was as high as 160 [per thousand]. It's less than 10 now, and that's never happened before." In fact, he suspects that a sizable component of the secular change in craniometrics is a genetic change due to natural selection. "If infant mortality was 160 in 1850 and now it's 10, that means there are 150 infants that would have died today but now survive."

How to contact the principal of this article:

Corey S. Sparks
Department of Anthropology
409 Carpenter Building
The Pennsylvania State University
University Park, PA 16802
e-mail: coreysparks@hotmail.com

Suggested Readings

- Boas, F. 1912 "Changes in Bodily Form of Descendants of Immigrants." In *Race, Language and Culture*. The Free Press, 1968, New York, NY.
- Jantz, R. L., and L. M. Jantz 2000 "Secular Change in Craniofacial Morphology." *American Journal of Human Biology*, 12:327-338.
- Sparks, C. S. 2001 *Reassessment of Cranial Plasticity in Man: A Modern Critique of Changes in Bodily Form of Descendants of Immigrants*. Unpublished M.A. thesis, Department of Anthropology, University of Tennessee, Knoxville, TN.
- Thomas, D. H. 2000 *Skull Wars: Kennewick Man, Archaeology and the Battle for Native American Identity*. Basin Books, Nevada Publishing Company, New York, NY.

Paleoindians in Brazil

continued from page 7

expedient-use pebble choppers, and we see clear cultural progression through time in the Old World. But we can't really assume that a New World hominid 50,000 years ago, with control of fire, had

a bag of tricks at least on a Mousterian level.

However, we can speculate. Some European Neolithic tool assemblages show that toolmakers had a very simple technology in terms of choppers and other expedient "disposables" they made, but they also had a sophisticated blade technology, which turns up in the archaeo-

logical record along with the cheap stuff. If such a technology were present in the New World at 50,000 years, we would expect to have seen evidence of it by now. On the other hand, only a few sites in that temporal range have even been explored. Furthermore, in Australia smash-and-grab expedient tool technology was in use right up until European

Kennewick Man: He's on the minds of a lot of people

Since the discovery of his skeleton in 1996, Kennewick Man has captured the attention of the nation in newspapers, magazines, technical journals and news-magazines (including **Mammoth Trumpet**), television, and Web sites.

Now he is the subject of an award-winning paper by Caitlin Feeney, a 12-year-old schoolgirl from Pasco, Wash. (Pasco, Richland, and Kennewick, which straddle the Columbia River at its confluence with the Snake, are known locally as the Tri-City borough.) Her paper, bearing the provocative title "Who Owns History? The Dilemma of Kennewick Man," took first prize at a regional competition in March, second prize at a state contest in May, and third prize at the National History Day competition in June sponsored by the University of Maryland. All told, 700,000 students competed nationwide; the final winners were chosen from 2,000 contestants, who were interviewed and their sources checked by a panel of judges. For her entry, Caitlin received \$250, a plaque, and a certificate.

The title of her 3650-word paper isn't misleading, for she has an ability rare for a student of her age to lay bare the issues underlying the disputed skeleton and to underscore the difficulty of the decision that U.S. Magistrate John Jelderks must make.

Neither side in the lawsuit pending in federal court in Portland, Ore.—the government who claims the remains are related to modern Native American tribes


under the terms of NAGPRA (Native American Graves Protection and Repatriation Act), or the scientist plaintiffs who assert that the 9,300-year-old skeleton predates tribal affiliations and may hold answers to how the Americas were peopled—can complain about Caitlin's evenhandedness. She is scrupulously fair when she discusses Native American objections to the study of Kennewick Man. Their objections, she writes, "represent long-standing grievances, some



formed during periods when the American government seemed intent upon eliminating, rather than recognizing Native American culture. . . . A prime example is the treatment of tribal burial sites. Since the time of President Thomas Jefferson, collectors and amateur anthropologists have plundered Native cemeteries in order to collect souvenirs." (She fails to mention the fact noted by David Hurst Thomas in *Skull Wars: Kennewick Man, Archaeology and the Battle for Native American Identity*, that Franz Boas, the Father of American Anthropology and a foe of racism—he fig-

ures prominently in "Shedding Dead Weight of the Past" in this issue—in his lean years himself traded in Indian skulls and skeletons for profit.) Outrage at the insensitive behavior of souvenir hunters and scientists over the years drove Native American activists to form what Caitlin calls the "repatriation movement," which ultimately culminated in NAGPRA legislation—and the lawsuit that today awaits Jelderks's decision.

"Native religions teach that once a body is interred, it must remain in the ground," Caitlin writes. Against this claim, Jelderks must weigh the demands of responsible scientists, *Bonnichsen et al.*, for whom human bones are "comparable to a 'time capsule.'" Caitlin observes correctly that "an expert can reconstruct Kennewick Man's stature, determine his diet, the injuries and diseases from which he suffered, plus make an educated guess about his lifestyle." When she notes that study of the skull "may also suggest ancestral origin," she hits dead center at the crux of the scientists' argument, for craniometric analysis of the Kennewick Man skull holds the greatest promise for unlocking secrets about the first Americans. (See "When Science and Politics Collide," **MT** 17-3 and this issue.)

Kennewick Man is a subject close to Caitlin Feeney. "[She] remembers seeing helicopters swirling for days over the site where two young men unearthed the skull of a 9,000-year-old man six years ago," writes Kristina Lord, staff writer for the *Tri-City Herald* newspaper. What is startling is Caitlin's ability to tell the story with remarkable lucidity and commendable scholarship. To read her paper, log on to the interpretive center maintained by the *Tri-City Herald*, www.kennewick-man.com 

—JMC



ALBERT RUSSELL NELSON

Dating to 11,060 CALYBP, the reconstructed individual from dos Coqueiros, shown here for the first time, is one of the oldest human remains in the New World.

tinuum stream do people first appear? Between the Pleistocene faunal horizons and human cultural horizons—whatever those turn out to be—may be some delineation, but how clear is it going to be and where does it actually fall? Right now it's comfortably within the period of 12,000 to 14,000 RCYBP, and no one is questioning that. Recall that not much more than a decade ago there were big questions about anything older than Clovis at 11,500 RCYBP! Excavations are producing answers. What about Rodriguez and its 18,000 RCYBP dates (about 21,500 RCYBP), or the 30,000 RCYBP horizon—plausible but needing solid documentation—both here in Brazil and at Monte Verde? Maybe it's simply a matter of time until a site or a series of sites provide

contact, so the possibility of human presence in the New World 30,000 years ago clearly isn't outside the realm of possibility.

In numerous publications Guidon describes the pains she took to authenticate the hearths, and she directly addresses the questions and criticisms of various archaeologists, notably Thomas Lynch and David Meltzer. However, I'm not aware that critical archaeologists have responded. This is the unfortunate result of replying to critiques in print—a simple exchange of information can eat up the lion's share of a decade. Nevertheless, she reports dates on excavation levels that are generally in good sequential order, demonstrating a temporal continuum spanning the reported range of years. Her evidence is tantalizing. It would be self-defeating to simply ignore it, particularly given the incredibly rich archaeological record in the area. There is human skeletal material at 12,000 RCYBP (about 14,000 CALYBP), and clear evidence of human occupation at 14,000 RCYBP (about 16,800 CALYBP). But where in that con-

the missing information needed to fill in some of the question marks at Pedra Furada. Today the area of São Raimundo Nonato is a treasure trove, rich in potential. The high density of very old sites suggests this is a very promising region for research on peopling of the New World, and the door is just now opening up.

Craniometrics holds clues

Woven inextricably into the fabric of dates and tools from old New World sites are questions about the identity and physical characteristics of the people themselves. Who were these most ancient of New World colonizers? The classic discussion has noted the presence of long-headed (dolichocranic) people early on, and short-headed (brachycranic) populations later. The individuals in the FUMDHAM collections with measurable crania fit this pattern. (The cranial index is the ratio of the breadth to the length; a skull is said to be dolichocranic if the index is .75 or less, and brachycranic if the index is .8 or greater.) The dimensions of the cranium of the Toca dos Coqueiros individual described by Dr. Lessa are 185 mm glabella-occipital length by approximately 125–135 mm maximum breadth, giving a cranial index in the neighborhood of .65 to .70, clearly dolichocranic. (The breadth figure is estimated because the right parietal was no longer bone; once the B72 embedded soil matrix was removed, it was no longer covered.) In contrast, more recent individuals are markedly brachycranic. A mature male from Toca do Gongo, about 2,000 years old, is 162 mm long by 140 mm wide, and a male about 19 years old from Toca da Baixa dos Caboclos, about 350 years old, is 170 mm long by 147 mm wide; both these skulls have a cranial index of .86.


Clearly, between 11,000 and 2,000 years ago a lot of changes must have occurred. We're looking at significant questions in the colonizing or populating sequence in this part of the New

COMING CONFERENCES

November 1–3 2002, New England Antiquities Research Association (NEARA) Fall Conference, *Across before Columbus, Plus 10: 1992–2002*, Five Points Sheraton, Waltham, MA. A conference reviewing the latest research and new evidence on early contacts with the Americas, featuring speakers from NEARA 1992 ABC Conference. Featured speakers include Dennis Stanford, John Sorenson, Nancy Yaw Davis, Mike Xu, Alice Kehoe, Betty Meggers, and Carl Johannessen.

Information: Register at Web site www.neara.org or by e-mail at abcplusten@hotmail.com

Send conference notices to Editor, Mammoth Trumpet, 93 Range Road, Blue Hill, ME 04614; e-mail wordsmiths@acadia.net 

World as elsewhere. Natural historians recognize that information comes from a variety of sources. The answers to questions of migrations from northeast Asia may be found in rock-shelters in the southern hemisphere. The São Raimundo Nonato area and the Serra da Capivara National Park, with their high density of archaeological sites particularly rich in Paleoindian horizon material, provide a major learning opportunity for archaeologists and their students. 

How to contact the author of this article:

Albert Russell Nelson

P.O. 228

Daniel, WY 83115

e-mail: arnelson@umich.edu

Suggested Reading

Lessa, A., and N. Guidon 2002 Osteobiographic Analysis of Skeleton I, Sítio Toca dos Coqueiros, Serra da Capivara National Park, Brazil, 11,060 BP: First Results. *American Journal of Physical Anthropology* 118:99–110.

About the author Albert Russell Nelson finished his doctoral work at the University of Michigan in 1998; his dissertation explored craniofacial similarities among American Indian

groups across the New World and compared them with samples from the Asiatic Old World and Pacific Basin as evidence for early and later occupations of the New World. He



ALBERT RUSSELL NELSON

received his master's in Forensic Anthropology from the University of Arizona following undergraduate studies at the University of Wyoming, where he is currently a research adjunct in the Department of Anthropology. He is the consulting physical anthropologist to the Wichita Nation and serves as the physical anthropologist for the University of Michigan-based Joint Mongolian-American Expedition. A recent joint

publication in the *Proceedings of the National Academy of Sciences* (98(17):10017–10022) examines potential Old World origins of the first New World inhabitants. This work in South America is a natural extension of his thesis work in North America; his future plans include excavations and field school in the Pedra Furada area.

CSFA at TAMU

Setting up shop



ALL: ROB BONNICHSEN