An Anthropological Culture Shift

A federal law that puts Native American rights and religion ahead of scientific curiosity is reshaping North American anthropology and archeology

Museums, universities, and federal agencies are beginning to clean skeletons out of their closets all across the United States. They're clearing out other objects important to Native Americans as well, such as sacred shields and medicine bundles. This flurry of housecleaning is prompted not by a shortage of storage space, but by a law that recognizes Native Americans' claims to their past.

The Native American Graves Protection and Repatriation Act (NAGPRA) requires some 5000 federally funded institutions and government agencies to return Native American skeletons, funerary and sacred objects, and items of profound cultural importance to American Indian tribes and Native Hawaiians. Although NAGPRA was passed 4 years ago, it didn't really start to bite until last November, when facilities had to notify the tribes about the sacred and cultural items in their collections. That was just the first step in a process that will see tens of thousands of scientifically valuable items handed over, many of them for reburial, over the next few years. Hundreds of scientists who depend upon this material will be cut off from their research data, and North American anthropology and archeology will be changed forever.

GILCREASE MUSEUM

Going back. Owl effigy pot dating from 750 to 1300 years ago, recovered from Arkansas, is one of several funerary objects expected to be claimed from the Gilcrease Museum, Tulsa, Oklahoma.

"The reality is there's been a shift in the equation," says Dan Monroe, executive director of the Peabody Essex Museum in Salem, Massachusetts. "It's a matter of basic human rights versus scientific rights, and in this new equation in many instances those scientific rights have been constrained, no doubt about it." But NAGPRA isn't just placing skeletons and artifacts out of reach of scientific study. It's also giving Native Americans influence over what research is conducted and published. Scientists who were once accustomed to "doing as they damned well-pleased," as one anthropologist put it, must now involve Native Americans in almost every phase of their research—from requesting research permits to study collections to, in some cases, passing completed studies to tribal councils for prepublication review. "The shocking thing is that we really haven't spent time talking to the Indians," admits Thomas J. Green, director of the Arkansas Archeological Survey. "NAGPRA is forcing us to do that, and maybe once we get through these issues, we'll see that there's actually a natural alliance between the archeological and Indian communities."

But this bridge-building doesn't mean that the bitter debate that preceded passage of NAGPRA 4 years ago has died down. Many scientists still decry the repatriation as an improper melding of church and state, and they are particularly upset that the law provides Native Americans very broad ancestral claims—even on items that scientists say predate the origins of the tribes themselves.

From the Indians' perspective, however, the return of sacred items is long overdue. "The reality is, it's our stuff," says John Pretty On Top, cultural director for the Crow. "We made it and we know best how to use it and care for it.... And now because of the law, we're going to get it back." Leigh Jenkins, the director of the Hopi Cultural Preservation Office, notes that graves and religious icons of all other peoples in America were never treated the way Indian material was treated. "Every tribe has sad stories about graves being pillaged, the offerings and skeletons taken, and ritual objects removed," he says. "Scientists always had one standard for themselves and another for Indians."

A shift of power

Now that museums have notified tribes that they possess sacred and culturally important Indian material, the next step will be to determine exactly what will be returned. By 1995, the museums must provide detailed inventories of all skeletal remains and funerary goods, and the tribes can then request that the material be shipped back to them. NAGPRA provides a set of guidelines to help Native Americans and museums sort out what can and cannot be returned, but both sides anticipate disagreements—particularly over prehistoric remains and burial goods. "Those are emerging as the flash point," says Jonathan Haas, McArthur Curator of North American anthropology and archeology at Chicago's Field Museum of Natural History.

No anthropologist interviewed by *Science* objected to reburial when the remains were those of a known individual—in fact, scientists expressed dismay that such items should have found their way to a museum in the first place. But the return and reburial of skeletal material several hundreds or thousands of years old, where ancestral relationships are not always clear, has researchers groaning—especially since these materials are often scientifically the most interesting. To American Indians, however, a skeleton's age is immaterial. "We don't accept any artificial cutoff date set by scientists to separate us from our ancestors," says Walter R. Echo-Hawk, the attorney for the Native American Rights Fund, one of the groups that fought for NAGPRA. "What Europeans want do with their dead is their business," he says. "We have different values."

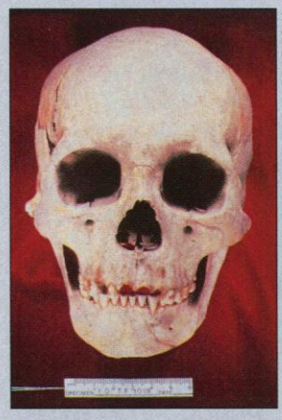
NAGPRA, in fact, places those values on an equal footing with scientific evidence. "The law explicitly says that their oral traditions have standing in this process," explains C. Timothy McKeown, an ethnographer and program leader for the implementation of NAGPRA at the National Park Service, the federal agency charged with overseeing the law. Thus, a tribe can claim prehistoric remains if tribal tradition says that its people were created in the same region where the remains were found—a claim that has already led to reburial of some collections under existing state laws (see box). (If a museum objects to these claims, then a special NAGPRA review committee will make the final determination, weighing both the scientific and tribal evidence.)

Many museums, in order to maintain good relations with the tribes and salvage some material for study, have already handed over, or are in the process of doing so, large collections of skeletons. The Field Museum, where more than 300 scholars a year come to use the extensive Native American materials, has given back 62 of its 2000 remains, and expects to return the rest. At the Smithsonian Institution's physical anthropological collections, 2000 skeletons have been returned for reburial, with the remaining 14,000 skeletons set to follow.

Many scientists are troubled by the prospect of massive reburials of prehistoric mate-

State Laws Provide a Glimpse of the Future

As researchers and museum officials begin to implement a new law requiring repatriation of Native American skeletons and artifacts, some clues to what lies ahead may be found in the operation of similar state laws already on the books. One of those laws in Idaho sent "Buhla," a 10,675-year-old female skeleton, back into the ground in 1992. Idaho state archeologists had recovered the bones from a gravel pit operation near the town of Buhl just 3 years earlier. During this time the remains had only been studied for 3 days, by a single physical anthropologist—research that was delayed because of technical problems in obtaining a radiocarbon date.



TODD W. FENTON, UNIVERSITY OF ARIZONA

Reinterred. Skull of 10,675-year-old skeleton reburied under Idaho state law.

The remains and the artifacts found with the skeleton were reburied on the Shoshone-Bannock reservation, 100 miles from where it was found—although archeologists doubt any Shoshone-Bannock inhabited the region 10,000 years ago. In the tradition of the Shoshone-Bannock, the woman is perceived as "our Mother; the Mother of us all," explains Diana K. Yupe, a Shoshone-Bannock anthropologist. "To us, she is our ancestor, and hers is not just a decomposed body; she is alive."

"There are about 25 skeletons in North America older than 8500 [before present]," says Thomas J. Green, the former Idaho state archeologist and now director of the Arkansas Archeological Survey. "And of these, she was one of the oldest and certainly one of the best preserved. Now, probably the most significant thing about Buhla is that she's reburied."

Archeologists expect to see a similar fate befall many of the funerary goods now stored in museums. A 1991 Arizona case, in which archeologists were complying with state law, suggests what might be in store on a broad scale. When a new highway in Phoenix was going to destroy a portion of a known, large Hohokam settlement called Pueblo Grande that dated from 900 to 1450 years ago, the state called in an archeological consulting firm to salvage and record what was found. Eventually, 2000 funerary vessels and 800 skeletons were recovered—the largest such collection of Hohokam pottery and individuals ever found. "It was the best collection of its kind," says Cory Breternitz, president of Soil Systems Inc., the archeological firm that handled the dig. "And we'd worked out an agreement about the study of this material with the tribes ahead of time." But in the spring of 1991, the tribal council objected to the study of the human remains, and a few months later every item was reburied on the Ak-Chin Reservation.

Also destined for reburial is the Grasshopper Collection, skeletal and funerary material dating from 1300 to 1400 years ago that was recovered from a large Mogollan complex on the White Mountain Apache Reservation over the past 30 years. Consisting of more than 700 skeletons and thousands of artifacts, including arrow points, stone and bone tools, beads, shells, pottery, and hair ornaments, it is now housed in the Arizona State Museum. According to University of Arizona archeologist William A. Longacre, who oversaw much of the excavation, it is "the best documented and largest collection from a single Native American community that's been occupied consistently for 100 years."

But the collection is going back into the ground. Although the excavations took place on White Mountain Apache land, the material is culturally linked to the Zuni and Hopi—and the three tribes have decided they want all the skeletons and grave goods repatriated and reburied. "It's an incredible resource that we are going to lose," Longacre says. "From our perspective, it is a terrible loss. But from theirs [the Indians], it's a terrible thing that we've done."

–V.M.

rials because they shut the door on studies using new techniques. "Once the material is gone, it is no longer available for restudy or for future studies using new techniques, nor can anyone check the original data for observer error—something that is fundamental to science," says Jane Buikstra, a physical anthropologist at the University of Chicago. Douglas Owsley, a physical and forensic anthropologist at the Smithsonian, points out that "we can do studies now—on health and disease, demographic rates, settlement patterns—that we simply had no inkling of when I was in graduate school [in the 1970s]. To say that we have learned all we can from these skeletons is a serious mistake."

Take the case of Ethne Barnes, a physical anthropologist at Witchita State University, who recently developed a new method for identifying developmental defects in adult skeletons. "The data collected in the past on these skeletons has very little value to my work," says Barnes, "because I'm looking at them from a completely new perspective and scaling the growth patterns differently than others have done." Barnes began her study shortly before NAGPRA, using skeletal material housed in the Smithsonian and other museums. Initially, she needed only the museums' permission to study the collections, but now she must also seek each tribe's permission, which is not always forthcoming. "The Cochiti Pueblo flat-out said no, while the Hopi were very interested," she says. However, the Hopi want to see her research results before she publishes. "It is a kind of censorship," she agrees, "but I also think we should be collaborating with the Indians."

So far, most of the attention has been focused on NAGPRA's impact on archeology and physical anthropology, but some scientists think it will eventually have a major effect on cultural anthropology as well. Lynne Goldstein, a mortuary archeologist at the University of Wisconsin, Milwaukee, says Native Americans aren't going to be satisfied with the return of bones and artifacts: "They'll ask next for field notes, tapes, photographs; and they'll insist that you have their permission before you publish." Goldstein's concern is more than hypothetical: The Hopi Tribe, in its response to the museums' inventory letters, asked museums to declare a moratorium on the study of any archival material pertaining to the Hopi people—a request that has stunned the museum community, although to the Hopi it seems a logical extension of NAGPRA. "We feel very strongly that there is a connection between the intellectual knowledge and the sacred objects that were collected from our religious altars: The knowledge and the object are one," says Leigh Jenkins. "The Hopi people want that esoteric knowledge protected right now."

An alliance out of adversity?

Despite all the turmoil NAGPRA has caused, scientists and Indians alike agree that the law has started to bring them together. Scientists, says Goldstein, "have to look at this situation pragmatically because the reality is, we lost....[F]or those of us doing excavations, we're going to have to be a lot more responsible collecting information and sharing it with the people we're studying."

Not sharing information appears to be at the root of much of the distrust now afflicting

academic researchers. Archeologists, for example, excavated homes and burials of the Pawnee people for more than a half-century before they ever contacted the tribe, says Roger Echo-Hawk, a Pawnee graduate student studying the relationship between oral history and archeology at the University of Colorado, Boulder. Indeed, scientists admit they made little effort in the past to involve Native Americans. "We've had to move from the ethics of conquest to the ethics of collaboration," says Martin Sullivan, director of Phoenix, Arizona's Heard Museum.

Still, scientists should "not look at collaboration through rose-colored glasses," says Goldstein, who points to her excavation last summer of a cemetery in California's Fort Ross State Park as an example. It took her 18 months to acquire all the necessary permissions—from state agencies, California and Alaskan tribes, the Russian Orthodox Church, and the local coroner's office—and then she went out of her way to keep all parties informed as the dig progressed. "Was it the easiest way to do archeology?" she asks. "Hell, no. But it was effective. Everybody felt they were a part of it."

Similar alliances, if they take shape, will probably coalesce around a new series of tribal museums. Not every tribe is planning to rebury all returned material; many have opened or are planning to open museums of their own, as the Confederated Tribes of the Warm Springs Reservation did last summer in Oregon. Some 120 such institutions now exist, and although some are little more than cultural centers, others maintain small research centers, which are staffed with Indian scientists.

The museums will have the material, and much of it (aside from sacred objects) will be made available to academic researchers, who are willing to work with tribal councils. "We do have common ground," says Roger Echo-Hawk. "If we build on that, we may create a new science of North American archeology."

–Virginia Morell

SHRINKING JOB MARKET

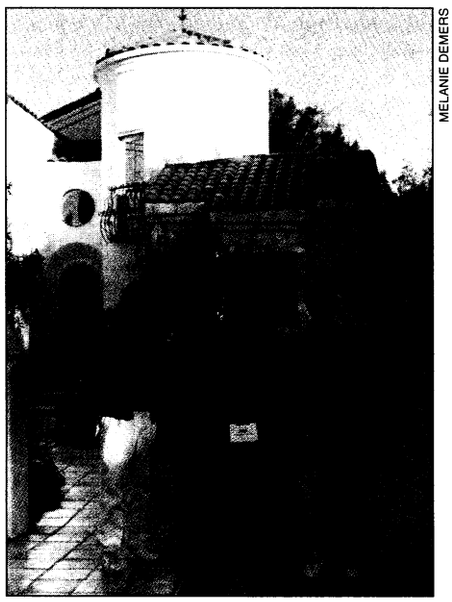
Young Physicists Hear Wall Street Calling

Ask young physicists what the job market is like these days, and they may answer with bleak humor. It's about average, one told *Science*: "worse than last year, but better than next year." Indeed, with the demise of the Superconducting Super Collider, the end of the Cold War, the precarious position of the national laboratories, and the slew of major corporations from IBM to General Electric that have cut back on their pure research, the market for physicists, whether theoretical or experimental, has been asymptotically approaching zero. And that explains why some of the best young physicists have taken refuge in one place where the curves have, for some time, been heading upward: Wall Street and finance.

No one is keeping tabs on this migration, but the anecdotal evidence for it is striking. Last year, for instance, two of the four students who received doctorates in theoretical physics from Harvard went off to jobs on Wall Street, and a third went into management consulting. The Collider Detector Facility, an experimental group at Fermilab, lost three postdocs to Wall Street. Of the 20 or so students who received theoretical physics doctorates over the last 5 years from Stanford University, only two or three, according to these students, are still in physics; they can name eight or nine who are working in finance.

Wall Street is happy to absorb the migrants, says Ron Unz, a former Stanford physicist and Oxford University Churchill Fellow who hired three other Stanford physicists for his company, Wall Street Analytics, which sells specialized software for structuring and analyzing what are known as mortgage-backed securities. "In many ways," he explains, "areas like finance, analyzing complicated securities, trading them, or designing systems to do that type of process, require many of the same kinds of skills and hardware creativity that physics researchers have to have." Rahime Esmailzadeh, who received a Ph.D. from Stanford in 1989 and began a postdoc at Berkeley's Center for Particle Astrophysics before joining Morgan Stanley, adds that physicists' backgrounds suit them to intensely mathematical tasks in the research departments of securities and investment banking firms, such as modeling options prices and risk management.

"Let me tell you about our group," says Esmailzadeh. "My boss is an ex-physicist. I'm a physicist. We hired one of my friends from UCLA who was in the same undergraduate program, and has his Ph.D from MIT. We have a consultant from the University of Texas, also a physicist, and we just recently hired two Ph.D. physics guys from Stanford." In addition, says Esmailzadeh, his firm has made offers to three former SSC experimental physicists.



MELANIE DEMERS

Physicists in finance. Ron Unz *(with sign)* and staff at Wall Street Analytics, in Palo Alto.

The recruits themselves are ambivalent about their move. All of the Wall Street migrants *Science* spoke to said they would rather have stayed in physics, but the decline of the field left them little choice. Esmailzadeh, for example, recalls the "romance of doing theoretical physics," but the romance wears off, he says, "when you start doing physics as a profession. You don't know where you'll end up every 2 years, and you don't know whether it's even possible to get a job." Adds former string theorist Dave Montano, who now works for Wall Street Analytics, "We really couldn't follow careers in physics, and making money is at least more interesting than options like engineering." Starting salaries for these Ph.D. physicists on Wall Street can be as much as $100,000 a year, including bonuses, whereas postdoctoral fellows might make one-third as much.

Those factors aren't just luring graduates in particle physics. Bob Laughlin, a condensed matter physicist at Stanford, says he lost his first student to Wall Street in early March when the student left a postdoc at the Institute for Advanced Study at Princeton and joined Goldman, Sachs. "He is arguably the brightest person I ever worked with in my life," says Laughlin. "He told me last summer that he was totally exasperated with not only the job situation in physics, but what it has done to physics as an art."

Such sentiments are driving many young physicists to cast an eye on the financial world even while they are still working on their Ph.D.s. Theorist David Land recalls that during his last year at Harvard, "you were more likely to see the Black-Scholes option pricing formula on blackboards in graduate student offices than anything to do with the standard model [of particle physics]."

Land is now with Goldman, Sachs, and he says he doesn't miss physics—at least not yet. "I will miss physics when something exciting happens. I can guarantee I'll be missing physics then."

–Gary Taubes