choff of the U.S. Geological Survey and others to show that the Neanderthal tool-making culture underwent a rapid change in Spain—several thousand years earlier than previously assumed—beginning about 40,000 years ago.

The problem with ^{14}C dating has always been the difficulty of keeping samples pure. A small inclusion of debris from the wrong layer of the excavation site or a bit of dust from the laboratory can throw results way off when very old dates are being sought.

But great improvements in carbon-14 dating have come in the last decade through the use of high-energy accelerators and mass spectrometers to take a direct reading of the ratio of ^{14}C to ^{12}C atoms. This contrasts with the old, indirect approach of measuring radioactive emissions and inferring the number of carbon atoms from that signal. The advantages of the new technique are that smaller samples can be used and the process is faster.

A further refinement, developed by Thomas Stafford at the University of Colorado in Boulder, among others, attempts to solve a long-standing weakness of ^{14}C dating: its poor record in dating bones more than 10,000 years old. As bones age, they lose collagen, and with it, most of the carbon atoms whose decay could be observed. Meanwhile, they tend to absorb chemicals from the environment around them, including fresh carbon atoms, making the sample appear younger.

The process Stafford uses is designed to avoid contamination by isolating amino acids that remain in bone after most of the collagen has gone. After these acids have been isolated chemically (producing tiny samples that may weigh as little as 0.5 milligram), the carbon they contain is tested for age. In theory, this method should make ^{14}C dating available for many bones that have never been testable before.

Many of the new technologies that came to fruition in the 1980s are considered experimental even by those who use them, like Bar-Yosef. But those techniques have delivered an initial body of data and with it a potent message about the origin of mankind. That message constitutes a challenge to the established order in paleoanthropology. During the 1990s there will be further debate over these new techniques. Archeologists and anthropologists will determine to what extent they respect them and whether the information they yield is to be included in the established order that is passed along to the next generation of scholars.

■ ELIOT MARSHALL

Hearing on Lab Vandalism

In January, two University of Pennsylvania scientists became statistics in the criminal justice system's catalogue of victims. On 14 January, someone broke into the office of Adrian R. Morrison, a sleep researcher. They stole files, videotapes, slides, and computer disks, and scrawled "ALF—First Strike" on the walls. A few hours later someone claiming to represent the Animal Liberation Front called Morrison's lab and described the incident as "a gentle warning." Ten days later, a former lab technician claimed responsibility for stealing some rats used in research from the laboratory of psychologist Robert Rescorla.

In spite of the significant disruption of his work—and the threat to his future safety—it was not easy for Morrison to interest the Philadelphia police. It's hard to get local authorities excited about investigating "a ransacked office and a few stolen rats," he says. Morrison acknowledges that police in a big city like Philadelphia have a heavy burden already. But, he adds, they "don't understand what's at stake" when a research laboratory is vandalized.

Would federal authorities do better? The question arises because Congress is considering two measures that would make vandalism of animal research facilities a federal crime. The Senate version, passed in November, makes it a felony to break into a facility subject to the Animal Welfare Act; both government and corporate research facilities are covered. The maximum penalty would be imprisonment for up to 1 year or a fine of $5000. The U.S. Department of Agriculture would have the principal regulatory authority.

The House is considering a bill that is narrower in scope but carries a bigger stick. Introduced by Representative Henry Waxman (D–CA), the measure covers only federally funded health research facilities and primate centers. Conviction could carry a penalty of up to 5 years and fines. The Federal Bureau of Investigation would be enlisted to enforce it.

The Bush Administration has been silent on the Senate bill, but the House measure has provoked conflict within the Administration. The Justice Department opposes the measure on the grounds that prosecution is best left to local authorities. They have prevailed, and officially the Administration opposes the bill. The Department of Health and Human Services, on the other hand, recommended that the White House support the House measure, as deputy assistant secretary of health James Mason testified last week at a hearing before the House health and environment subcommittee, which Waxman chairs.

Recounting the attack on Morrison's lab, Mason said, his voice rising: "The people who broke into the lab are terrorists. The nation must not tolerate this kind of criminal activity."

To show the subcommittee the scope of the problem, Mason offered statistics from the National Association for Biomedical Research. According to the association, in the past 8 years there have been 71 incidents involving theft, firebombing, bomb threats, or arson against facilities connected with animal research. One in five entailed bomb (or other) threats, and one in ten involved actual or attempted arson, bombing, or firebombing.

Mason argues that such attacks are damaging research. In the past 2 years the number of published articles on drug addiction based on animal research fell by 62%, he testified. The Public Health Service, Mason says, has "anecdotal information indicating a link between this drop in research and threats by animal rights extremists."

But opinion remains divided over whether making lab vandalism a federal crime is the best solution. Staff aides from the House agriculture subcommittees, which are holding an oversight hearing February 28 on protection of animal research facilities, say critical data are lacking. Supporters of the House measure contend that local authorities are hampered in prosecutions because the people who carry out the breakins sometimes flee across state lines. But no one has figures on how often this occurs, leaving open the question of how much federal intervention would help.

Meanwhile, Mason pointed out to Waxman's subcommittee, some observers feel young researchers may choose not to go into biomedicine due to obstacles raised by animal activism. The "loss of bright and dedicated people to the field of biomedical research is a grave concern in the long run," Mason said. ■ MARJORIE SUN