paradigm shift.

The trip itself was set up to showcase 2 decades of work by the site's tireless excavator, Thomas Dillehay of the University of Kentucky. Those who have seen his evidence in recent years say it is remarkably thorough and convincing. The coup de grâce came in a long-awaited 1300-page monograph to be published in March by the Smithsonian Institution and given to members of the expedition. This opus offers new radiocarbon dates on wood to show that humans lived at the site at least 12,500 years ago, and describes in detail their footprints, stone tools, and shellfish and other materials brought in many miles from the coast. The Monte Verde people lived in huts with wooden frames and animal-hide roofs—unlike anything found at Clovis sites. The monograph is "almost overkill," says archaeologist David Meltzer of Southern Methodist University in Dallas, and it had convinced many researchers even before the trip, including one prominent skeptic, archaeologist Dena Dincauze of the University of Massachusetts.

The one member of the trip who was not persuaded beforehand was C. Vance Haynes of the University of Arizona. And his epiphany is indeed significant, archaeologists admit, because his stature as a leading Clovis expert will influence nonspecialists and the undecided. He and the others inspected the site, which has been mostly destroyed by farmers and now blends into a sandy hillside. But new trenches allowed the group to see the artifact-bearing layer in a "secure stratigraphic context," topped by a layer of peat dated to 10,300 to 12,000 years ago. "So, the artifacts had to be older than that, and I had to buy those dates," says Haynes. With most of the group already persuaded, "I was the heavy," he recalls. After days of intense debate, the moment of truth came at a bar in a nearby town. "I asked if people would agree that the site was 12,500 years old," recalls Meltzer. Everyone did.

And even though that date is only 1000 years older than the oldest dates for Clovis sites, it spells trouble for models that suggest that settlers walled an ice-free path in Canada when glaciers retreated about 12,000 years ago, making it unlikely that they reached Chile. Alternate models suggest that the first settlers traveled by boat or arrived before the ice sheets formed.

As news of their acceptance of the site spread, community reaction was decidedly mixed. Some were relieved that such a prominent skeptic as Haynes had publicly accepted a pre-Clovis site. Others were a bit irritated by what they saw as an overblown press response. "What's the big fuss?" wonders University of Texas geoarchaeologist Karl Butzer, who had considered the published date of 12,500 on Monte Verde "uncontroversial" for some time. Clovis expert Reid Ferring of the University of North Texas agrees: "I've been teaching my students for years that there is sufficient evidence that Monte Verde is pre-Clovis. You don't have to go to Chile to figure that out." In his view, the trip was chiefly a public benediction of the site: "I've been teasing them that they should have carried incense burners." Jacques Cinq-Mars, an archaeologist at the Canadian Ministry of Civilization, agrees: "There's a paradox there. You're glad it's been done. At the same time, it's a bit irritating that the site has now been blessed by the Inquisition." It's especially irritating to those who disagree. Despite the publicity, insists Lynch, "these things aren't proven overnight."

–Ann Gibbons

ASTRONOMY

Is First Extrasolar Planet a Lost World?

With perhaps a dozen extrasolar planets apparently in the bag, worlds around other stars may have started to seem commonplace. A paper in yesterday's issue of *Nature*, however, could dispel any complacency. In it, a respected Canadian astronomer labels the first apparent discovery of a planet orbiting a sunlike star a case of mistaken identity.

David Gray, who specializes in studies of stellar spectra at the University of Western Ontario, claims that the team of Swiss researchers who announced the discovery almost a year and a half ago were misled by a subtle, periodic signal in the spectrum of the star 51 Pegasi. Based on his own observations, Gray says the signal, originally attributed to the gravitational tug of a roughly Jupiter-sized planet, was actually generated by a complex sloshing on the star's surface. "The planetary hypothesis simply can't explain the observations," says Gray. "It's gone. Period."

Now you see it ... The star-hugging planet inferred from a wobble in the spectrum of 51 Pegasi.

As preprints of Gray's paper began circulating last week, his blunt conclusion sparked some heated exchanges. The planet's original discoverers, Michel Mayor and Didier Queloz of the Geneva Observatory, along with Geoff Marcy and Paul Butler of San Francisco State University, who quickly confirmed the finding 15 months ago, have already posted their riposte on the World Wide Web. They label as "extraordinarily premature" Gray's claim that the signal of the "planet" is accompanied by a change in the shape of spectral lines that no planet could cause—pointing out that he has analyzed just 39 measurements of one line in the star's spectrum in observations spread over about 7 years. They also single out what they see as weaknesses in Gray's own explanation for the signal, which relies on complex surface oscillations never before seen in a sunlike star.

Other astronomers, however, think Gray's critique of the 51 Pegasi planet deserves at least a hearing, and that oscillations like the ones he is invoking—if they really occur—could be a confounding factor in other planet searches. "It raises an alarm bell of sorts," says Aleksander Wolszczan of Pennsylvania State University, whose earlier discovery of three planets around an exotic star called a pulsar has stood up to scrutiny. "[Gray] may well have overstated the case a little bit," says William Cochran of the University of Texas, Austin, "but it sort of suggests an alternative explanation."

The dispute centers on dark absorption lines in the spectrum of 51 Pegasi—valleys in its spectrum that result as elements like nitrogen, iron, and calcium in the star's atmosphere soak up light coming from below. The planet searchers had monitored hundreds of these lines for a minute Doppler shift indicating that the star was wobbling toward and away from Earth as a planet tugged it to and fro. The data showed "an almost perfectly sinusoidal Doppler curve," says Butler—which suggested to Mayor and Queloz that a planet was circling 51 Peg every 4.23 days (*Science*, 20 October 1995, p. 375).

When Gray monitored just one iron line at much higher resolution, however, he came to a contrary conclusion. The wobble due to a planet should shift the wavelength of the line without altering its appearance, but Gray's iron line seemed to change its shape and its depth over the same 4.23-day period as the wobble the planet searchers identified. Only the star itself could be responsible for changes in line shape, says Gray, who concludes that the Doppler curve "has been erroneously interpreted as a planetary sign."

In their joint response on Marcy and Butler's Web site, the Geneva and San Francisco groups point out that an earlier study of 51 Peg by a group of astronomers at Texas, including Cochran and Artie Hatzes, had

ruled out distortions of the magnitude Gray found. Cochran and Hatzes are quick to note that they may have made too few observations to see the changes Gray has spotted. But Wolszczan agrees that resolving the discrepancy will be a crucial first step toward reaching a verdict on the planet.

Even if the data prove to be correct, however, few astronomers are ready to accept Gray's explanation for the changes in line shape: massive, persistent upheavals of the star's surface roughly analogous to ocean swells. Gray and Hatzes are collaborating on a scenario in which these swells, sloshing across the star's visible face, could both shift the lines—explaining the Doppler shift that the planet searchers detected—and change their shape. But "nonradial" oscillations with such long periods, while theoretically possible, have never been detected in the sun or other stars, says Timothy Brown, who studies stellar pulsations at the High-Altitude Observatory of the National Center for Atmospheric Research in Boulder, Colorado. He adds that if 51 Peg were oscillating as Gray proposes, it would probably flicker in overall brightness—which it apparently doesn't.

"We rule out any reasonable kind of pulsations," says Sallie Baliunas of the Harvard-Smithsonian Center for Astrophysics, who with her collaborators showed that 51 Peg's overall brightness stays constant to within 0.04%. "Of course, that leaves the bizarre." The explanation "is not impossible," agrees Brown. "But if it is nonradial pulsations, then it's much stranger and more interesting than the planetary hypothesis."

Ironically, say some astronomers, the regular gravitational tug of a closely orbiting planet is one thing that might amplify an otherwise small oscillation into something strong enough to explain Gray's data. And a team that includes Athena Coustenis and Jean Schneider of the Observatoire de Paris-Meudon in France thinks that another effect might reconcile the data with a planet: the boiling off of its upper atmosphere due to its closeness to the star. The team's preliminary estimates show that an ionized cloud could form around the planet and pass periodically between 51 Peg and observers on Earth.

What Gray's claim about 51 Peg might mean for the other planets reported recently is still less clear. His oscillation scenario may have a hard time explaining them away, say other astronomers: They have different orbital periods but similar parent stars, whose oscillations would be expected to be similar as well. "This is a very interesting situation," says Queloz, who adds that he and Mayor are now searching for traces of the spectral distortion in their own data on 51 Peg. "I don't know who is right and who is wrong. This is just science. You try to do your best."

–James Glanz

Scientists Go Sleepless in Seattle at AAAS Meeting

SEATTLE—Over 5000 people turned out for the Annual Meeting and Science Innovation Exposition of the American Association for the Advancement of Science (AAAS, which publishes *Science*), held 13 to 18 February. Last week, we covered early sessions (*Science*, 21 February, p. 1061); in this issue, we cover talks on mechanisms for resisting HIV, the maritime skills of early Americans, neutron stars, the demographic transition, and public attitudes about science.

A New Way to Resist AIDS?

One mystery that has long puzzled AIDS researchers is why some people who have been repeatedly exposed to HIV—including, for example, some prostitutes in Kenya and some hemophiliacs and intravenous drug users—seem to resist infection by the virus. At the Seattle meeting, Miles Cloyd of the University of Texas Medical Branch in Galveston presented new data suggesting that some of these individuals may carry immune cells that, even after having been invaded by the virus, don't allow it to replicate.

This resistance mechanism, if it is confirmed, would join one identified last year. Scientists studying exposed but uninfected people found that in a small number of these individuals, HIV could not enter, or infect, immune cells in the first place. As several labs reported, these resistant people had inherited a defective version of a coreceptor on the surfaces of immune cells that HIV uses to dock onto the cells and gain entry—a defect that protected them from the virus (*Science*, 27 September 1996, p. 1797).

Cloyd's mechanism would operate at a different stage in the viral life cycle. His group was studying CD4 lymphocytes—the white blood cells selectively destroyed by HIV—from about 50 randomly chosen, healthy people at low risk for HIV exposure. The researchers found that when they added HIV to the CD4 cells, the virus couldn't reproduce itself in cells from up to 15% of the individuals, depending on the strain of virus. HIV replication seemed to run into a roadblock, the researchers found, some time after the virus had entered the cells and copied its RNA into DNA. Cloyd speculates that the cells may have inhibited viral proteins, called Gag proteins, involved when HIV pastes the DNA copy into the host cell's DNA. Children appeared to inherit protection against specific strains from their parents, Cloyd says, so the factor may be genetic.

Whether this mechanism seen in cell cultures offers people real-world resistance to HIV is another question. But Cloyd has tentative evidence that it may. His group examined CD4 cells from two men whose blood cells initially tested positive for HIV but several months later tested virus-free—even though the men weren't taking AIDS drugs. "It could be hiding in lymphatic tissues, but the virus seems to be shut off," Cloyd says. In cell cultures, these men's CD4 cells seemed to act the same way as the resistant CD4 cells did in the earlier study: Although the virus successfully invaded the men's CD4 cells, once inside it could not replicate.

Other researchers at the session say that Cloyd's new work, while provocative, is still preliminary. "It's highly believable that there will be host factors that will block HIV post-entry, but it's too early to say how important this will be in HIV transmission," says Richard Koup of the Aaron Diamond AIDS Research Center in New York City. Cloyd says the group is now hoping to firm up its findings by checking for resistance in CD4 cells from 50 HIV-free men who are at risk of contracting the virus from their infected partners.

–Jocelyn Kaiser

First Floridians Found Near Biscayne Bay

Recently dated fish bones and artifacts reveal that Indians were basking in the Florida sun almost 10,000 years ago. The finding, reported at a session on the use of maritime resources by early Americans, pushes back by at least 3000 years the time that people are known to have inhabited the Atlantic Coast of North America, says archaeologist James Dunbar of the Florida Bureau of Archaeological Research in Tallahassee. It also adds to a picture of impressive maritime skills among early Americans on both coasts.

Dunbar's colleague, Dade County archaeologist Robert Carr, discovered the bones and tools in a limestone sinkhole at a site known as Cutler Ridge, overlooking Biscayne Bay on the Atlantic Coast. While several maritime sites from this era have been