SCIENCE IN SOCIETY

Cloning Plan Spawns Ethics Debate

He seemed an unlikely "man of the hour," as ABC anchor Ted Koppel referred to him in a *Nightline* interview last week. But when a gangly 69-year-old physicist named Richard Seed aired his plans to launch a human cloning clinic in Chicago, he became an overnight sensation. Seed, who is unaffiliated with any university or research institution, has told reporters that a hand-picked team of physicians will attempt in the next few months to use newly developed cloning techniques to enable an infertile couple to have a child. In the face of nearly universal unease with the prospect of human cloning, the brazen pronouncement has fired debates over the ethics of cloning—and the dynamics of science journalism, too.

CHARLES BENNETT/AP PHOTO

A giant leap? Seed offered to clone ABC's Ted Koppel.

Many scientists view human cloning as a tantalizing, if distant, prospect for helping infertile couples have children. It's possible "that some cloninglike technology will be the only therapy that will allow an infertile couple to have a genetically related child," says Sean Tipton, a spokesperson for the American Society of Reproductive Medicine. But given that nobody has been able to reproduce the feat that resulted in Dolly the sheep—cloning an animal from an adult cell—many experts are skeptical that what Seed has set out to do can even be done. And even if it were feasible, "the chance of abnormal offspring is high," says Roger Pedersen, a physician at the University of California, San Francisco, and a major proponent of a voluntary moratorium on human cloning that many scientific groups have pledged to adhere to.

Still, Seed's face, voice, and words were a big hit for news organizations worldwide. He has declined to disclose the names of the four couples who he said have volunteered or of the physicians he said have agreed to work on the project. But Seed, who received a Ph.D. in physics from Harvard in 1953, has not skimped on rhetoric: He told National Public Radio (NPR) that "cloning and the reprogramming of DNA are the first serious steps in becoming one with God." This and similarly eyebrow-raising statements—he even offered to clone ABC's Koppel—have drawn deep skepticism from the scientific community. "This guy should have been ignored," says Dorothy Nelkin, a sociologist at New York University. Seed could not be reached for comment.

Indeed, at first, Seed's plans were mostly ignored. Seed announced his intentions last month at a conference in Chicago on science and law, but only the *Milwaukee Journal Sentinel* and a few other regional papers covered the story; he also got a mention in a commentary in this month's issue of *Nature Biotechnology*. "I wasn't convinced he had the resources or the people to do it," says Rick Weiss, a science writer at *The Washington Post* who was at the conference but decided to lay off the story. "I didn't want to just give him a free pulpit to [raise] his venture capital."

The media snowball began rolling after NPR sent out press releases touting a story on Seed on its 6 January evening news show, *All Things Considered*. Joe Palca, who reported the story, says he was skeptical initially until Seed took him to meet some of the physicians he had lined up for the project. Palca says he hoped his story would raise public consciousness about human cloning. Many news organizations, including *The Washington Post*, felt compelled to follow NPR's lead. "I didn't want to get scooped on a story I had known about for a month," says Weiss. Ronald Kotulak, a science writer at the *Chicago Tribune*, decided reluctantly that the newspaper couldn't ignore what had become "a national sensation." The *Tribune* put a half-dozen reporters on the story.

Even the White House jumped into the fray. In his Saturday radio address on 10 January, President Bill Clinton reiterated his determination to pass legislation that would place a 5-year moratorium on human cloning research. Ironically, some opponents of human cloning in Congress may benefit from Seed's announcement: It "certainly could help, and definitely would not harm, my efforts" to get legislation passed to ban cloning, Representative Vernon Ehlers (R–MI) told *Science*.

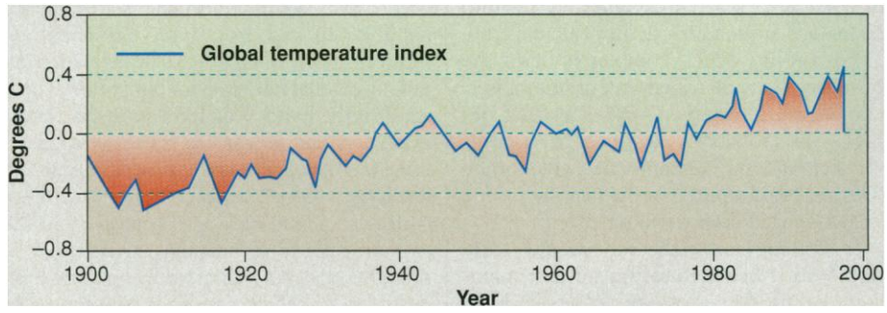
What worries some observers is that a rush to judgment could torpedo nonhuman cloning efforts. "Hastily drafted legislation," warns Carl Feldbaum, president of the Biotechnology Industry Organization, a Washington, D.C.–based lobby, could "inadvertently ban legitimate research" on topics such as the regeneration of nerve tissue or skin for burn victims. It's a shame, Nelkin adds, that the episode hasn't seeded a more worthwhile discussion about the risks and benefits of cloning.

–David Kestenbaum

GLOBAL CHANGE

The Hottest Year, By a Hair

Last week, government climatologists hailed 1997 as the warmest year of the century, citing it as another sign that greenhouse warming is real. But it might have been worse. Although last year's upward creep of the thermometer could help make the 1990s the warmest decade on record—warmer than the scorching '80s—computer climate models have called for the rising levels of greenhouse gases to be having a bigger effect on global climate. Reality may catch up with the models, however. By the turn of the century, researchers say, some factors that have slowed global warming so far will dissipate, and it will arrive in earnest.



SOURCE: NCDC/NOAA

A slow burn. The 1990s are running warmer than the '80s did, with 1997 the warmest on record. The warming—charted relative to the 1961–90 mean—has been tempered by pollutants and natural forces.

Boosted by one of the most powerful El Niño warmings of the tropical Pacific Ocean in this century, 1997 grabbed the title of warmest year from co-holders 1995 and 1990, according to a global record of land

and sea temperatures compiled by climatologists at the National Climatic Data Center (NCDC) in Asheville, North Carolina. Last year was 0.08°C warmer than its rivals, announced Thomas Karl, a senior scientist at the NCDC. Since 1900, the same record shows that Earth has warmed by about 0.5°C. The year would not have been a record-breaker if El Niño had not warmed the ocean surface, Karl noted, but it was still one of the five warmest years over land since 1880.

The margin of victory was a lot slimmer—a statistically insignificant 0.01°C—in another analysis of global temperature announced this week by climatologist James Hansen of NASA's Goddard Institute for Space Studies in New York City. The two analyses agree, however, that it has been especially warm lately. Hansen found that the four warmest years on record all fell in the 1990s; in the NCDC analysis, nine of the past 11 years have been warmer than any previous years on record.

But computer climate models predicting the effects of rising greenhouse gases suggest that the globe should be warming even faster—about twice as fast as observed. Pollutant hazes from the burning of fossil fuels, forests, and agricultural lands are moderating the warming by blocking sunshine, as did debris from the eruption of the Mexican volcano El Chichón in 1982 and Mount Pinatubo in the Philippines in 1991. The destruction of stratospheric ozone by chlorofluorocarbons (CFCs) is cooling the atmosphere from the lower stratosphere down, because ozone absorbs incoming solar radiation and blocks the escape of heat. And even the slight, cyclical brightening and dimming of the sun may affect temperatures.

In the November 1997 issue of the *Journal of Geophysical Research*, Hansen and his colleagues took their best shot at modeling these cooling effects between 1979 and 1996. They only left out pollutant aerosols, whose changing abundance is too uncertain to factor into the models. In that period, they calculate, the known cooling effects completely offset the warming effect of added greenhouse gases. The warming observed—a modest 0.2 degrees—was probably a carry-over from previous decades, says Hansen, when greenhouse gases increased rapidly but the heat-absorbing oceans delayed their warming effect.

In coming years, the sun should warm slightly as it heads toward a sunspot maximum, ozone depletion should level off as CFC controls take hold, and the oceans can retard greenhouse warming only so much. Meanwhile, greenhouse gases will continue to rise. Unless another massive eruption spews a global sunshade, Hansen and his colleagues have "an expectation of new record global temperatures in the next few years."

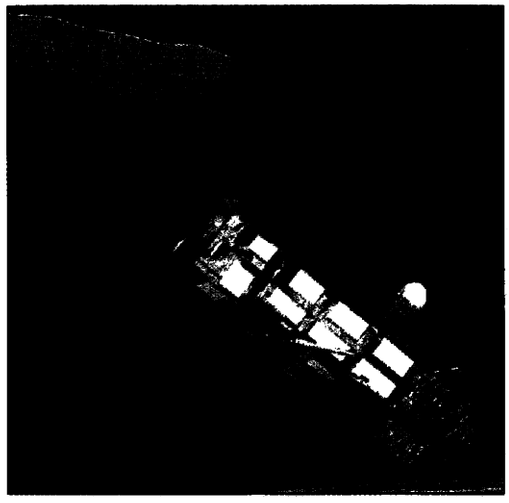
–Richard A. Kerr

EARTH OBSERVATION

Europe Forges a Plan in Collaboration With Industry

When Antonio Rodotà took over as head of the European Space Agency (ESA) last summer, he promised to forge a new relationship between the troubled agency and Europe's aerospace industry. Last month, an ESA task force outlined a new strategy for supporting Earth-observation missions that would more than fulfill Rodotà's pledge. It would make industry a full partner in designing, developing, and funding an entire class of missions.

The proposal, previewed at a crowded meeting of industrialists at ESA's science and technology center (ESTEC) in Noordwijk, the Netherlands, on 18 December, would divide future Earth-observation programs into "Earth Explorer" missions, which are mostly scientific, and "Earth Watch" missions, geared toward applications and operational uses. Explorer missions—which have yet to be defined in detail—would be fully paid for out of ESA's budget. It is the Earth Watch missions that would mark a radical departure from the agency's usual way of doing business. David Southwood, a physicist from London's Imperial College who is coordinating ESA's strategy, told the gathering that these missions would either be private initiatives supported by a strong business plan, in which case ESA would provide expertise, facilities, and some money for technology development, or be risk- and cost-sharing partnerships between the agency and industry. ESA would only join such partnerships if the industrial sponsors have purchasers for the data lined up, said Southwood.



ESA

End of an era. ENVISAT will be the last of ESA's currently scheduled remote-sensing satellites.

This new plan, which will be fleshed out at ESA headquarters over the next few months and presented to the organization's member states this summer, is designed to fill a looming gap in ESA's Earth-observation program. Until now, ESA's efforts in Earth observation have been somewhat ad hoc. The agency launched its first remote-sensing satellite, ERS-1, as late as 1991, and although that mission and its sister, ERS-2, have been highly successful, they were driven more by technology than the need for a particular type of data. ESA has only one more remote-sensing mission under way: the giant multisensor ENVISAT—conceived as part of Europe's contribution to the space station—due for launch in 1999. "The need for a strategy is a major issue," says Alain Gaubert, secretary-general of the Paris-based trade group, Eurospace. "There is nothing planned beyond the year 2000."

The seeds of ESA's emerging strategy were sown in November 1995 at a meeting in Toulouse, France, of government ministers responsible for space from all of ESA's 14 member states. The agency issued a statement jointly with the European Commission and the European Meteorological Satellite Organisation calling for a long-term Earth-observation strategy that would spawn both scientific and applications satellites and would foster Europe's space industry "as it went through consolidation and regrouping." Without support, the statement said, European industry would find it hard to compete with the more mature U.S. space industry, which was also the beneficiary of technology developed with large military budgets.

ESA's response was to form a task force last June, supported by an industrial working group. Both comprised senior figures in European space policy. "We inherited the Toulouse statement," says Roy Gibson, ESA's first director-general and the only person on both the task force and the working group. Last October, ESA appointed Southwood, a former chair of the committee that plans ESA's space science program, to head the task force and oversee development of the Earth-observation strategy.

Last month's meeting at ESTEC revealed the first hints of the task force's thinking. One clear message was that industry should bear a large part of the costs of applications programs. "We are saying to industry, we have finally heard what you are saying; let's see if you mean it," Southwood told *Science*. "Joint funding has to happen or nothing happens. It will be a salutary experience for both sides, and it will be equally instructive if nothing happens." An-