permitted. (However, separating cells to duplicate an embryo for implantation would be forbidden; the panel considered it morally unacceptable.) Hughes is pleased his work has been approved. But he notes an irony: If the guidelines had been written before the procedure was tested, "they wouldn't have allowed it, because you wouldn't know if taking a blastomere from an embryo was going to create a birth defect." He concedes the new rules may be arbitrary in favoring some areas of research while discouraging others, like a "two-edged sword."

Will politics take command?

National Institutes of Health Director Varmus need not accept these recommendations at face value, but as the calendar moves toward the day when he must decide which he supports and which he will modify, the tension is rising. Even if Varmus does not back down on any of the panel's new openings for research, researchers at the 250 or so U.S. private fertility clinics, which aren't controlled by federal regulations, are likely to see the new rules as too restrictive.

David Adamson, a leading fertility researcher in Palo Alto, California and chair of the research committee of the Society for Assisted Reproduction Technology, says he's concerned that "we not develop a national policy that is more politically oriented than scientifically justified." Adamson argues that "we are really just scratching the surface" of new methods for helping infertile couples; it could be a mistake and an unfair burden, he thinks, to saddle the field prematurely with a lot of detailed restrictions.

From the conservative side, meanwhile, comes the International Foundation for Genetic Research, which despite its name seems eager to discourage some types of genetic research. Located in Pittsburgh, this group, which claims to represent parents of children with birth defects, filed a federal suit in June against Varmus, Health and Human Services Secretary Donna Shalala, and members of the Muller panel, charging that panel members have conflicts of interest and should be prevented from giving NIH any advice.

Specifically, the suit argues that panel members like Hughes, who is developing genetic screening methods for IVF clinical use, and Hogan, who has a stake in a company that hopes to produce cell lines from aborted fetal (not embryonic) tissue, should not be shaping federal policy. Hughes responds that it is hard to imagine how NIH could develop policy without help from researchers who know the most about the subject—and they are just the ones who are likely to be funded by NIH and have investments in biotech. Hogan argues that her patent for stem cell production has no application in embryo research and presents no conflict.

Academic scientists find themselves caught in the middle, taking a moderate and pragmatic point of view. Many feel, as Hughes says, that by laying out specific guidelines, the NIH panel "legitimizes the science in a way that hasn't been done before." These researchers hope that the public, seeing that scientists have adopted a measure of self-restraint, will be ready to offer funds after a long dearth.

In the end, though, the limits on embryo research may be set by Congress, not NIH. A warning shot was fired by California's Dornan on 16 June, when he sent Varmus a letter signed by 35 members of Congress. They demanded to know Varmus's authority for revising research. "Congress has not examined these initiatives, and the American people are largely unaware that the NIH is even contemplating using their tax dollars to fund such bizarre experiments on living human embryos," they wrote. And they suggested the panel members had conflicts because many "seem interested in potential grants for these kinds of experiments."

Varmus replied on 21 June that NIH's mission includes attacking "infertility, pregnancy loss, genetic disease, and cancer" and all these areas "might benefit from research involving the ex utero human embryo." As for conflicts of interest, Varmus replied that "no individual was found to have a disqualifying conflict...that would significantly affect, or, in our judgment, give the appearance of affecting the member's duty to participate impartially" in weighing ethical issues.

An aide to Dornan says the congressman was not satisfied with this response; Varmus, he says, will soon get another letter. For its part, NIH appears to feel the best hope of winning broad support lies in informing the public about the potential health benefits of embryo research. As Varmus wrote Dornan, NIH thinks a great "misunderstanding" may have fomented opposition to certain research tools, such as the use of parthenotes. To help educate the public about the subtleties of embryo research, NIH is planning a special media briefing a week before the release of a draft report on 20 September.

By then, the air inside Washington's Beltway may be cooler. But it remains to be seen what the climate will be like in the halls of power. Biologist Van Blerkom recalls that when he made his presentation to the Muller panel, there were "three very big guys wearing big crosses" sitting in the back row. They reminded him, he says, that there are dimensions to the embryo research controversy that have not fully surfaced yet. Is the research community, he wonders, truly prepared for the "enormous debate" that may erupt when new guidelines for embryo research are issued? We will find out soon enough.

–Eliot Marshall

ASTRONOMY

Europeans Push Ahead With Disputed Observatory

The eight-nation European Southern Observatory (ESO) decided last week to press ahead with its Very Large Telescope (VLT) project in spite of a gathering storm in Chile, where the instrument is scheduled to be built. The VLT, a set of four 8-meter telescopes to be used as a single instrument, will be the world's largest telescope when it becomes operational, which ESO hopes will be soon after 2000. Those hopes could be dashed, however, by a dispute over ownership of the site atop Cerro Paranal in northern Chile and by a history of poor relations between ESO and Chilean astronomers and workers.

But ESO's governing council signaled its determination to stick to the original schedule by giving the go-ahead to ship parts of the first rotating dome in September or October. "We're showing our good faith by putting 500 tons of steel on a ship to Chile," says ESO director general Riccardo Giacconi. "It's risky, but then there is a risk that timidity would damage the project." The council is hedging its bets, however: It also asked the organization to continue looking for alternative sites for the VLT. "If a catastrophic development occurs, we can always remove the equipment [from Chile]," says the council president, Peter Creola of Switzerland's Federal Department of Foreign Affairs.

The clear, dry air above the Atacama desert in northern Chile makes it one of the best sites in the world for ground-based optical astronomy. In the 1960s, three foreign-administered observatories were set up to take advantage of these conditions: the Cerro Tololo Inter-American Observatory (CTIO), one of the United States' National Optical Astronomy Observatories; ESO's La Silla observatory, which now has 14 telescopes; and Cerro Las Campanas, set up by the Carnegie Institution. Claudio Anguita, former director of the University of Chile's department of astronomy, says that Chilean astronomers have had happier dealings with the U.S. observatories than with the European one.

The CTIO, Anguita says, signed an agreement with the University of Chile guaranteeing its astronomers 10% of the observatory's viewing time. And Chile has now become a partner in the Gemini project, which will link twin 8-meter telescopes, one at Mauna Kea, Hawaii, and one at CTIO. "We feel at home [with CTIO]"

says Anguita. ESO, in contrast, has no special arrangements with Chilean astronomers, requiring instead that they compete for time alongside researchers from its member countries.

Poor labor relations have also dogged the European observatory. As an international organization, ESO did not recognize local trade unions at La Silla—workers had to take their grievances to the international labor organization in Geneva. Chilean workers formed an independent trade union, however, and in 1991 it protested the preferential pay and benefits given to staff recruited in Europe. In contrast, Mark Phillips, director of CTIO, says observatory workers there have had a trade union for years, and relations between the union and the observatory management have been good. "We follow Chilean law to the letter," says Phillips.

The most serious threat to the VLT project, however, is the dispute over the land, which crystallized what Phillips calls a "mood of antagonism" in Chile toward ESO. In 1988, Chile's military dictatorship gave ESO 725 square kilometers on Paranal for the new project and agreed to extend the privileges that ESO and the U.S. observatories enjoy at existing facilities—including exemption from taxes and immunity from national laws—to the new site. When democracy was restored to Chile in 1990, however, doubts about the deal began to surface.

ESO

Disputed ground. The first parts for the Very Large Telescope are being shipped to Chile's Cerro Paranal.

Last year some members of the Chilean parliament declared that the military junta's donation was not legal. Meanwhile, descendants of Admiral Juan Latorre, a hero of the 1879 War of the Pacific against Peru and Bolivia, claimed that they own some of the land around Paranal and are suing both ESO and the government. A judge from Chile's supreme court is examining the evidence. ESO maintains that, whatever happens in the parliament and the courts, Chile must honor its 1988 agreement. An international treaty overrides national law, says Giacconi.

To try to win the Chileans over, ESO has spent the last year negotiating a supplementary treaty with the Chilean government that would meet some of the demands of local workers and astronomers. "Politically, the time is right for a new set of rules," says Creola. Chilean labor law will be incorporated into the new treaty and, although the exact details are not yet finalized, Creola says that the current version guarantees 10% of the viewing time on the La Silla telescopes to Chilean researchers. On the VLT, the figures would be 5% for Chileans and another 5% for joint projects between Chilean and European astronomers.

But ESO is still taking no chances: If relations with Chile continue to worsen, ESO already has its eye on a nice, flat-topped mountain in Namibia called Gamsberg, which has climatic conditions similar to La Silla's. But many astronomers, even in Chile, would be sad to see the VLT go elsewhere. "Paranal is the best place for the VLT. It would be a loss for astronomy in general," says Anguita. Says Phillips: "It's time to heal the wounds and get going on this telescope."

–Daniel Clery

ECOLOGY

Wiping the Slate Clean at Biosphere 2

A few months ago, the outlook could hardly have looked bleaker for the ambitious glass-enclosed ecology project in the Arizona desert known as Biosphere 2. After 2 years of technical bugs and relentless criticism from scientists, Biosphere's troubles boiled over in late March, when its owner, Texas billionaire Ed Bass, brought in federal marshals to oust its managers, whom he accused of financial mismanagement. But now big changes are afoot, changes that some of the project's critics think could help it finally live up to its scientific potential.

This week, Bass announced that Biosphere has formed a non-profit joint venture with Columbia University's Lamont-Doherty Earth Observatory to conduct research at the $150 million, 3.15 acre facility, the world's largest sealed ecosystem. The venture will be run by an executive board including such prominent academics as Wallace Broecker, a Lamont-Doherty geochemist; its science committee will be headed by Michael McElroy, chairman of the Department of Earth and Planetary Sciences at Harvard University. The new managers will develop Biosphere's first research plan and will forge ties to other research institutions. Says biogeochemist Bruno Marino, who left Harvard this month to become Biosphere's new research director, "We're wiping the slate clean."

The formula is exactly what some scientific critics have said all along that the visionary but troubled project needs. "This is great news," says Gerald Soffen, director of university programs at the NASA-Goddard Space Flight Center, who was once an adviser to Biosphere and has since been an outspoken critic. Complete with rainforest, desert, and tiny ocean, the facility is "an experimentalist's dream," says Marino. But ever since its completion in 1991, critics have complained that science was taking a back seat to New Age theater as successive crews of "Biosphereans" sealed themselves into the miniature ecosystem. Biosphere's managers shunned controlled experiments and allowed outside scientists in only reluctantly (*Science*, 11 March, p. 1368).

"This is great news....It sounds like science is finally taking over."

—Gerald Soffen

Now those managers are gone, and Biosphere can get down to "good, basic, objective science," Marino says. At least a dozen researchers from fields such as ecology, plant biology, and soil physics are being commissioned to visit Biosphere and determine what science could be done there—for example, studies of how plant growth is affected by high concentrations of carbon dioxide.

Biosphere's new keepers know they have a lot of work ahead, especially if they are to attract funding from federal agencies and other sources to make the research self-supporting. "We need to show that we're credible, that we really are going to do good science," Marino says. Broecker, who is one of the few scientists to have done experiments within Biosphere, is already seeking federal funds for work there, and this fall he and graduate student Jeff Severinghaus may publish two papers on studies of the carbon cycle in Biosphere. "We're dipping our toe in the water to see what reviewers and government agencies think of this," Broecker says.

But Soffen thinks Broecker and his colleagues have made a good start. "It sounds like science is finally taking over."

–Jocelyn Kaiser