

# Decision at Asilomar

Could 140 gene scientists make a sociopolitical decision?  
After three days of proving they couldn't, they did.

by Janet H. Weinberg

*Two weeks ago, an international group of molecular biologists met at the Asilomar state park conference center on the Monterey peninsula to chart the future of gene-transplant research. What they decided is already a matter of record (SN: 3/7/75, p. 148). How they decided it is reported and interpreted here.*

Two dozen of them sat or paced or stood in small groups at gate 61, waiting for the short flight from San Francisco to Monterey. It was no trouble deciding which of the passengers were going to Asilomar—scientists have a muted, sensitive nonconformity that is rather obvious to the confirmed science watcher. A few carried registration packets, and there were briefcases and corduroy jackets and suede shoes. The only incongruence was that within four days, they would make a unique moral decision for the future of science. Policy making suited them at that point as poorly as top hat and tails.

A few young, successful American molecular biologists called the international conference after it became clear that they and their colleagues had released a partly malevolent genie in the form of a technique for transplanting genetic information from one unrelated organism to another. With it, man could manipulate evolution more surely than with breeding or medicines or pollution combined. Theoretically, in time, scientists could replace defective genes with working ones to prevent and cure diseases. And they could insert into animals and plants the genes for desirable characteristics, like nitrogen fixation in corn or insect resistance in apples or super weight-gain in chickens.

But they knew the genie's malevolent side could not be ignored in this magic carpet scenario. Both by accident and by purposeful manipulation, genes for drug resistance or cancer or lethal toxin formation could be inserted into common organisms. Biological warfare agents and massive epidemics could be created too effectively this way. So the American scientists called their most prominent colleagues from around the world to ponder the hazards of this double-edged scimitar.

Conference organizer David Baltimore of MIT deposited the burden of

a moral decision in his opening remarks to the 140 conference members as they sat in a Spartan chapel near the rocky Asilomar beach. We are here to explore the technological problems and future of recombinant DNA molecules, he said, but "many are looking to this meeting for guidance. If we don't provide it, we'll have left a serious void."

The goal for this meeting is the construction of guidelines and if "we come out split and unhappy, we have failed the mission in front of us. And we will have no one to appeal to."

Washington attorney Harold Green, a long-time student of scientific policy, echoed this responsibility in an address to the group. The organizing commit-



Watson: No illusions of regulation. Brenner: No license for the lab door.



And on the first day, there were technical lectures. Twelve of them.

tee's actions are "an act of social responsibility and therefore can be considered a public policy decision" which cannot now be avoided, he said. "There is a momentum inherent in science and technology which is fueled by a desire for a better lot and for getting ahead. If we want to guide technology, we must intervene before technology takes over. We must take a somewhat more deliberate, explicit, more pessimistic view" than has been the general pattern at the start of other technologies.

Conference chairman Paul Berg of Stanford nodded tentatively with each of Green's points and glanced at the crowd for signs of agreement. There were few. It was apparent from the beginning that the Americans who called for the meeting were at least half way out on a limb. Eyebrows were

researcher confided that "because of chauvinism, the world scientific community will act independently on this issue. When we saw that letter, many of us had that 'John Foster Dulles rides again' feeling." Besides that, he said, any decision here is unlikely because "scientists are probably the wrong people to make it."

The scientists spent the next three days proving that statement to be right over and over. And then, ultimately, they proved it wrong.

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On the first day of the conference, they presented each other with technical information on the ecology of the organisms used for gene transplant research. The beckoning of an exquisite Monterey spring did not reach those inside the chapel. With shades drawn

audience."

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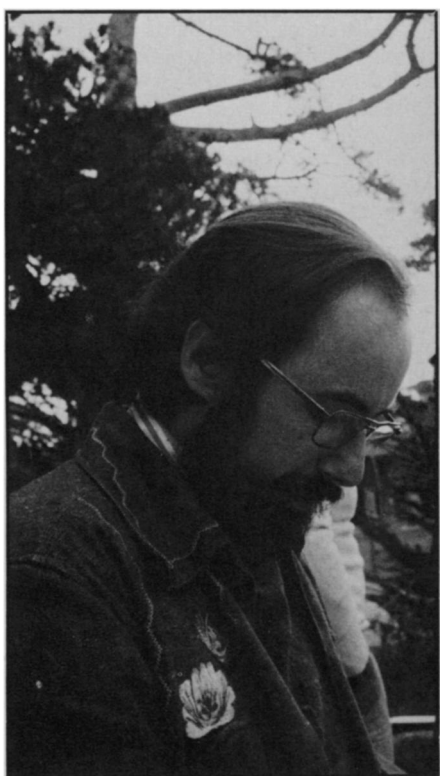
The conference organizers had assigned researchers in three potentially hazardous areas to draw up working papers on how the experiments in each area could be done safely. Tuesday morning, the first group presented its paper, and the first signs of confrontation appeared. Ephraim S. Anderson, an ascerbic medical microbiologist from London, laid out the first of the many conflicting positions. He demanded to know which of the panel members had experience in handling and disposing the pathogenic microbes to be used in much future genetic engineering. "If you are going to issue guidelines, you ought to understand what you are talking about." His represented a fairly common sentiment, that biochemists and molecular biologists are not trained to handle pathogenic organisms and yet are devising guidelines which would impinge on the freedoms of old-line medical microbiologists used to handling pathogens.

Objections to the letter and the spirit of the first working paper came pouring from the previously silent audience. Several young researchers (described by one bemused Britisher as young colts chafing at the starting line for their Nobel prizes) were obviously anxious to resume the work they had deferred since the previous summer in compliance with the ban. They wanted to know how their own research interests would be affected by the tentative restrictions in the working paper.

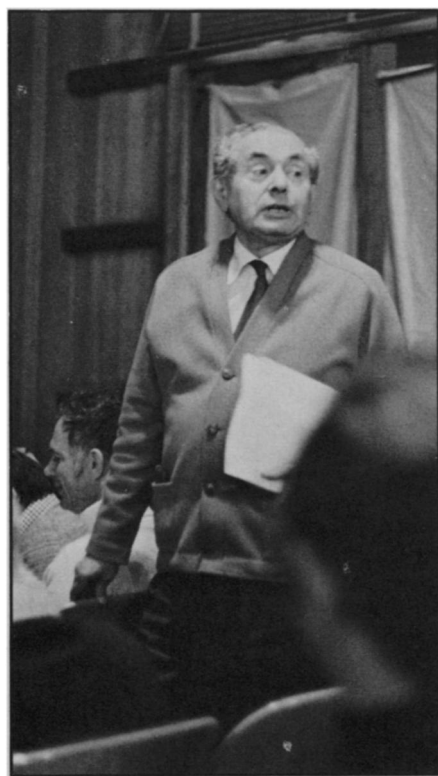
Nobel laureate Joshua Lederberg of Stanford feared that a specific document would be crystallized into law by suspicious legislators hardly qualified to make decisions on highly technical problems like containment of risky organisms.

Prominent scientists, many long in charge of large laboratories and used to making decisions in an academically free climate, did not like the idea of outside regulation, even by their peers. Harvard Nobel laureate James D. Watson, looking tousled and myopic, insisted that the risks from gene transplant research could not be measured in this early stage. And even if there are great dangers, he said, "there should be no illusions that regulation is possible." People would only cheat on the rules behind laboratory doors. Scientists will just have to live with the dangers if they work in this field, he said pragmatically, and be aware that if something goes wrong, they might be sued.

One outspoken young researcher, David Botstein from Cold Spring Harbor Laboratory in New York, countered Watson. "I would like to make a very simple argument for guidelines in this field. I'm not omniscient. My experi-



Baltimore: Burden of a moral decision.



Anderson: First of conflicting ideas.

raised in the elite European scientific community when an open letter had first been published by the American group last July. It called for a self-imposed moratorium on certain types of research until the conference convened. With 80 percent of the research going on in the United States, the voluntary halt of the juggernaut seemed to some suspiciously like the fox guarding the henhouse. Many of those eyebrows were still arched at Asilomar.

Before the sessions started, a Scottish molecular biologist said pointedly, "I am here only as an observer, and I think that's true of the other international members. This is an American show and an American decision for American research." Another British

and slide projector humming, they pursued their cerebral gray obsession, their slightly dangerous and exciting biotool for molding evolution. The unique language and concepts of molecular biology seemed a shelter from moral decision-making. Twelve technical papers were presented, the last one when the dark and the jet lag were robbing even the most obsessive of their attention. There had been no discussion of the moral issues the first day. One scientist grumbled that the presentations were too long, too technical, and not illuminating the moral issues and the question of risks versus benefits. "People are only presenting the work that made them famous—they just can't resist with such an important

ments usually go wrong, then I learn from them and correct my mistakes." There may be a danger of guidelines becoming rigid laws that cut into academic freedom, he said, but the prize-winning scientists of the world are not the only ones who will do the experiments. Ten years from now, genetic engineering kits might be standard equipment in high-school classes.

Throughout the uncomfortable exchanges, Paul Berg's craggy face became downcast and apprehensive. The consensus decision to which his reputation would be linked was slipping away like the pure white Asilomar sand through dry fingers—lost in a barrage of unyielding, self-indulgent and conflicting attitudes. "It's just a waste of time to hack away at specific details," he said. "Do we leave here after four days with a consensus or with only the admonition to be careful?"

Halfway through the discussion, conference organizer Sydney Brenner from Britain's Medical Research Council made an impassioned statement to steer the discussion from barren territory. In sonorous tones, Brenner, a five and a half foot scientific Puck, chastised the group for its parochial concerns. The group is here to make a unique, broad policy decision about the future of genetic engineering—shall the field proceed, how, when, by whom and for what purposes? "If people think they are going to get a license from this meeting, a notice they can put up on their door, if they are just *pretending* there is a hazard and are going along with it just so that they can get tenure and be elected to the National Academy and other things that scientists are interested in doing, then the conference will utterly have failed."

As if recoiling from the unpleasant confrontation, they retreated to the safety of pure science. Brenner led a massive brainstorming session on ways to construct safe experimental organisms that will self-destruct outside of the test tube, thereby reducing the chances of toxic agents escaping the laboratory. The flexibility and creativity that many lacked toward making policy that morning literally blossomed in the light of a forward-looking scientific challenge. They spoke for hours on plasmids and phages and reagents and culture methods as the afternoon light changed from white to amber. As if in a Carlos Castañeda fantasy, one could almost see them connected by strands of crystalline energy, relaying sparks from the electric mass of ideas.

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Wednesday was another tense and frustrating day. More working and technical papers presented, more heated debate, no consensus. The group seemed to be caught in an argument as circular as a bacterial chro-

mosome: There are dangers and there should be guidelines. The guidelines should only be strict enough to prevent untoward risks while being lenient enough to allow for investigatory freedom. But the risks cannot be measured so early in the game. So there is no way to assign guidelines with the assurance that they are only as strict as they need to be. And if we make them now at all, they might get translated into rigid limiting laws and our freedom will be lost before we can start to use the technique for mankind. Yet there are dangers. And if we don't regulate ourselves, society will step in and do it without our expertise. But there are no facts to judge the risks. . . .

The central obstacle seemed to stem from deductive training, from the way scientists learn to think and analyze problems. They were taught that there is a set of facts for every situation from which one can deduce other pieces of information. In the absence of the facts, one cannot make an informed decision. Yet here they were being asked to balance the risks to society—before they could possibly be quantified—with the benefits to society—which they hoped would be large. And the conference deadline was pressing. Scientific minds, as the British researcher predicted, were probably the worst kind for making sociopolitical decisions.

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Luckily for the conference, the decision was not made in a vacuum. The conference organizers had wisely invited lawyers and journalists, constant, although sometimes unwanted reminders that the world outside the narrow community of molecular biologists was interested in, would rely upon, and would ultimately judge their actions. Newspaper reporters scurried around with notepads, demanding to know how a moral decision made by the group would affect the housewife in Peoria. And the lawyers, in formal presentations and informal discussions, hammered away relentlessly on the need for social responsibility.

Attorney Daniel Singer of the Institute of Society, Ethics and the Life Sciences at Hastings-on-Hudson, N.Y., admonished the group to acknowledge that it was making societal and ethical judgments. "There is no reason to shrink from the task, or feel that it is demeaning." The risks, he said, are not just scientific, but social. "And the proponents of risky experiments have the burden of demonstrating that the risks are trivial or that the benefits are certain and overwhelming." It is not the burden of the rest of society, he said, to prove them dangerous.

With the clear legal logic that is often quite outside the realm of incontrovertible fact, law professor Alexander Capron of the University of Penn-

sylvania reminded them that in the eyes of society and the law, "prior restraint is appropriate where physical harm is at risk." And a third lawyer, Roger Dworkin of Indiana University, punctured the sometimes overly pompous body. Complications might sneak up on recombinant gene researchers, he said, "like million dollar law suits." And although the law is favorable to experts who regulate themselves, "there is a history of disaster for expert groups who don't use the option of self-regulation."

The most potent force for stopping the deductive merry-go-round, though, was the constant and eloquent persuasion of scientists who felt the moral responsibility to protect society more pressing than their own needs for academic freedom and success or even their desires to improve the biological world. Conference organizers, like Berg, Brenner and Baltimore, and a couple dozen others from Europe and the United States, hinted, cajoled, and as time grew short, demanded that their peers become at long last voting members of the world community. Abstaining was no longer possible. They demanded from each other not just technical excellence but morality.

Whatever the conference decides, Brenner said, it will have no legal force. In the end, each scientist's judgment and behavior would have to guide him to use the powerful biotool with a sense of moral responsibility to the innocents inside and outside of the laboratory. These discussions, one graying researcher mused before the final session, will mark the end of the age of innocence for basic research. They are a catalyst, another said, a final logical step in the heightened awareness that scientists control people's lives to some extent, and must account for it.

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The scientists and observers shuffled over the flagstone path to the chapel for the last time Thursday morning. Some of them had been up almost all night, drafting a final working paper to pull together the disparate opinion and capture a consensus. And within four hours, they had it. The international group decided, by majority vote, to end their self-induced ban but to replace it with general guidelines. The guidelines will allow some experiments, defer others until safer containment is available, and all but ban others considered highly dangerous. The guidelines will have only the force of peer pressure.

A few of the scientists, still unconvinced, spun away like tops into deductive circles. The rest of them left Asilomar quietly, in groups of two or three, with their muted nonconformity and their corduroy jackets and their moral responsibility. □