MEETING REPORT

OPENING THE FIELD TO ENVIRONMENTAL RELEASE

PHILADELPHIA, Pa.—The 150 ecologists, microbiologists, and molecular biologists gathered here reached no final consensus on "Engineering Organisms in the Environment: Scientific Issues," the topic of an interdisciplinary symposium June 10-13. The conference did open discussions between field and laboratory biologists, however, and Yale's Edward A. Adelberg could point in his summation to some emerging principles, bones of contention, and questions that need finer statement.

The biotechnologists' "battle cry," Adelberg noted, was "Focus on the product, not on the process"—meaning that regulators should consider a product's composition and purpose, not whether it is made by genetic engineering or by conventional means. "The real problem," Adelberg said, "is the introduction of any organism, recombinant or not, into a new environment."

It is clear, Adelberg said, that researchers must design their projects and their organisms for both maximum benefit and minimum risk. To minimize risk, Adelberg recognized the desirability of "recallable," self-limiting, or self-destructing organisms. While limiting the mobility and survivability of plants and animals should be fairly straightforward, creating self-limiting microbes may be technically difficult, he warned.

Minimizing risk could include even such measures as abandoning antibiotic resistance as a marker for released organisms, as urged by Grace Wyngaard, an ecologist at the University of Maryland (College Park). Stuart B. Levy (New England Medical Centers, Boston) reported on the "epidemic" transfer of an antibiotic resistance plasmid from species to species and hospital to hospital—from Seattle to Boston to Caracas. This example of plasmid ecology serves as a model for gene transfer in the environment. Investigation also showed that resistance tends to be associative: organisms resistant to one long-used selective agent are quick to pick up new resistances.

The pressing question in all of this is how to assess the benefits and risks of a proposed release. Adelberg said, "Do we try to predict the behavior of a new organism from general principles, or do we analyze them case by case?"

Most genetic engineers called for case-by-case evaluation though inexperience may make evaluation difficult. Adelberg referred to the keynote remarks of Peter R. Day (Plant Breeding Institute, Cambridge, U.K.): when discussing the risks of recombinant technology, one deals with "conjectural" rather than statistical or even potential risks (which after all must rest on data collected from experience). Day contrasted this conjectural danger with the "daily abuses committed on the environment in the name of agriculture."

Most data on ecological impact involve new organisms quite different from those already in an ecosystem. Most such introductions never "take" at all, noted Daniel Simberloff of Florida State University (Tallahassee). Of 913 species introduced into California, some 89 percent had no environmental effect at all, and only 2.5 percent had what could be called serious impact. A single new species, or a minute change in an established species, can radically change an ecosystem, though, Simberloff said.

In the end, Adelberg said, general principles will probably be irrelevant or inadequate to evaluate the complexities of real applications. General principles—which have yet to be elucidated—will be vital, however, in helping researchers design tests and even recombinant organisms themselves. Several speakers pointed out the need for standards for defining—and techniques for measuring—such important parameters as survivability, potential for genetic transfer, toxicity, and mobility.

Until accepted standards evolve, the field will face a continuing problem, Adelberg said: Researchers can't release an organism in the field until they know the effect on the environment, but they can't know the effects (or how to extrapolate from a greenhouse model) until they have released an organism in the field. Ultimately, Adelberg said, "There has to be permission to move," or agricultural and environmental biotechnology will remain stalled in the laboratory.

The American Society for Microbiology, in collaboration with seven other biological societies, convened the conference at the request of Sen. Albert Gore (D-TN). Eight government agencies—including the Department of Agriculture, the Environmental Protection Agency, and FDA—provided funds. **—Douglas McCormick**

TECHNOLOGY DEVELOPMENT

U.K.'S WELLCOME TO ATTACK GRAFT-VERSUS-HOST

LONDON—Wellcome Biotechnology Ltd. plans to commercially develop CAMPATH-1, a monoclonal antibody which virtually eliminates the graft-versus-host reaction that so bedevils bone marrow transplantation. Herman Waldman and Geoffrey Hale discovered CAMPATH-1 while working in the pathology department of Cambridge University with financial support from the Medical Research Council. Tests on patients in Britain and West Germany have shown that the antibody reduces the incidence of this severe complication of marrow grafting from as high as 50 percent to around five percent. Before surgery, donor marrow is treated with CAMPATH-1, which attaches to and destroys T cells that would otherwise attack tissues in the recipient.

This and other potential applications are covered by licensing terms reached recently between Wellcome Biotechnology and the British Technology Group (BTG), whose "first rights" claim to discoveries made on U.K. campuses has been terminated by the government. The Department of Education and Science has now urged academic scientists to exploit their own inventions, approaching BTG only if they wish to do so.

Coincidentally, the CAMPATH-1 deal (concluded under the previous exclusive arrangement) comes when Wellcome Biotechnology has been in the news because of the decision by its parent company, The Wellcome Foundation, to go public. The huge pharmaceutical group (which in turn is wholly owned by the Wellcome Trust, a registered charity) plans to sell 20 percent of its shares on the London Stock Exchange next year.

Not all members of the biomedical community are happy with the new commercial winds blowing through the company, which was founded a century ago by American Henry Wellcome. Some feel that pressure to show a profit margin closer to those of its rivals will curb Wellcome's freedom to concentrate on products such as vaccines against tropical infections. **—Bernard Dixon**