

Davis

copy

Bacterial Physiology Unit,
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Boston, MA 02115

May 22, 1987.

Mr. L. Val Giddings,
Office of Technology Assessment,
Washington, DC 20510-8025.

Dear Dr. Giddings,

draft

Thank you for sending me a copy of your Special Report on Genetically Engineered Organisms in the Environment.

In recently preparing a report on The New Biology, under contract to the OTA for a publication on Science, Technology, and the Constitution, I had occasion to go through a number of OTA reports on various aspects of biology and medicine, and I was impressed by their balance and their high quality. I was therefore deeply disappointed find the draft on Genetically Engineered Organisms excessively alarmist in tone and not at all well balanced. I have not read the document in detail, but the summary supports the unfortunate view, widely disseminated in the press, that all organisms prepared by molecular genetic manipulation must be treated as potentially dangerous, rather than recognizing that large classes of engineered bacteria, involving no pathogenic component, present no greater danger than the bacterial variants that have been prepared by classical genetic techniques and released in the past. Thus, on p. 1-4:

"Microbes are small and easy to handle in the laboratory, and they reproduce rapidly. But these same traits make microorganisms risky to release into the environment. Because they are invisible, they are difficult or impossible to track with current techniques... Furthermore, they are ubiquitous and play key roles in many fundamental ecological processes. Releasing them into the environment could therefore trigger a host of unpredictable -- and undesirable effects."

I consider this statement quite illogical, for the ubiquity, density, and high rate of genetic variation in the microbial world in nature supports the opposite conclusion: that our introductions will not be detectable, except locally and transiently, against the background of all this noise. At a recent meeting of the NIH RAC Frances Sharples presented the same objection more succinctly, in opposing a redefinition of recombinant: "The trouble with microbes is you can't even see them." When I have quoted this statement to scientists who work with microbes I am met with incredulity or laughter. And in the RAC -- including administrators, lawyers, bioethicists, and physicians as well as microbiologists, Dr. Sharples was outvoted on this issue 16 to 2.

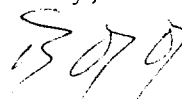
Under these circumstances, there would be no point in my commenting in detail unless you are prepared to undertake a radical revision. While this would obviously be difficult for your organization, it is pertinent to look at the history of a shorter report on the same subject that is being prepared by the National Academy of Sciences. The early versions of the report were somewhat alarmist (though less than your draft), and internally inconsistent in trying

to reconcile the view of the ecologist on the committee with the views of other members; hence there were serious objections from members of the Council and other members of the Academy who were consulted. Patient work by the chairman of the committee (a plant pathologist deeply knowledgeable in the field) eventually persuaded the ecologist to accept a heavily revised version, which I find quite satisfactory.

It is my understanding that the mission of the OTA is not to seek a political consensus on controversial scientific issues but to provide Congress with the best scientific information and judgment it can obtain. On the issue of genetically engineered organisms there is a most unusual controversy between two scientific communities: ecologists (at least those who have made public statements) and members of scientific disciplines that deal with microbes. Good advice to Congress really cannot combine these two points of view; and in choosing between them, the quotation above provides clear evidence of the innocent and frightened attitude of many ecologists toward the microbial world. I would also call attention to the history of parallel earlier fears of unpredictable harm from laboratory research with recombinants, and to some firmly established and relevant scientific principles, summarized in my article in Science, Mar. 16, 1987; and I would suggest that the position supported by ecologists defeats their purpose of protecting against hazards to the environment, since it will delay the replacement of known toxic chemicals by harmless biological pesticides.

Because of the heavy representation of ecologists among your contractors, the extraordinary lack of names that I can recognize as microbiologists or molecular biologists, and the difference between your review process and that of the NAS, I can see that it may be impossible for you to undertake the kind of revision that the NAS did. But unless the report is either buried or radically revised the OTA will find itself out of step with many of the most responsible elements in the scientific community, including the NAS, the NIH RAC, a statement being prepared by the Public Affairs Advisory Committee of the Amer. Soc. Biol. Chemists, and the recent editorial by Daniel Koshland on the subject in Science. You may also find yourselves providing fuel to some of the fringe activists who have so lowered the quality of much of the discussion of these problems. It would be sad to see the excellent record of OTA blemished by such a report.

Sincerely,



Bernard D. Davis,
Adele Lehman Professor of
Bacterial Physiology.
Emeritus.

c/B. Healy

PS. Thinking that I ought to look a bit further into the document before sending off this letter, I opened it at random and encountered the following. "Active research cooperation -- both financial and political -- among microbiologists, geneticists, ecologists, and evolutionary biologists should be encouraged.... Unless attention is focused on such efforts, this area of biotechnology [i.e. risk assessment and risk management] will be without an

adequate scientific foundation and remain dominated by unsubstantiated speculation." This statement is much like a letter to Science by one of your contractors, Norse, which I criticized severely in my later article in that journal; for while the ecologists promise a definitive experimental basis for assessing risk they offer no convincing operational program; hence well established scientific principles (? "unsubstantiated speculation") still offer our best basis for making broad judgments as to which classes of organisms might be dangerous and which it would be wasteful to hold up for detailed investigation.

While I have been inclined to assume that most ecologists have been primarily motivated by sincere concern for the environment, the naked pressure in this document for increased financial support -- as though the present extensive support of molecular biology originated instead of following its breakthroughs -- encourages a more cynical view, which I have frequently encountered among my colleagues. I fear that in the long run the tactics of the ecologists will decrease their support from the rest of the biological community, as well as harming biotechnology; and I would urge the OTA to consider whether it may not be lending itself, in this document, to cooptation by a group lobbying for funds.