LETTERS

Recombinant DNA Rules

In clarification of the article "Major relaxation in DNA rules" (News and Comment, 21 Sept., p. 1238) and especially the sentence, "The proposal would in effect exempt all experiments in which *E. coli* K12 is the host for recombinant DNA molecules," it would seem useful to publish in full the motion passed by the National Institutes of Health (NIH) Recombinant DNA Advisory Committee (RAC). This was

> Those recombinant DNA molecules that are propagated in *E. coli* K-12 hosts not containing conjugation-proficient plasmids or generalized transducing phages, when lambda or lambdoid bacteriophages or non-conjugative plasmids are used as vectors, are exempted from the Guidelines, subject to the prohibitions of I-D-1 through I-D-6. Prior to initiation of the experiments, investigators wishing to carry out such experiments must submit a registration document that contains (a) a description of the source(s) of DNA, (b) nature of the inserted DNA sequences and (c) the hosts and vectors to be used. This registration document must be dated and signed by the investigator and filed only with the local IBC [Institutional Biosafety Committee] with no requirement for review by the IBC prior to initiation of experiments. P1 containment shall be used for all experiments in these categories.

All actions of the RAC are advisory to the director of NIH, who has not yet issued a decision on this or other recommendations made at the 6-7 September RAC meeting.

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Pollution, Plants, and Fertilizer

J. C. Noggle of the Tennessee Valley Authority (TVA) is quoted (Research News, 27 July, p. 383) as saying that TVA sulfur emissions are roughly equivalent to the crop requirements of the region. Using Noggle's own dollar values, it can be calculated that the cost of the sulfur needed by crops is less than 20 cents per acre per year using commercial fertilizers to replace the nutrient sulfur which would be lost if crops should be "deprived" of sulfur from power plant emission sources.

However, power plant plumes (such as those produced by TVA) are generally not thought to be selective in depositing various forms of sulfur in the proper chemical form on just those agricultural crops which require it and at the proper stage in crop growth. Large sulfur sources tend to supply their plume products indiscriminately to all of the environment whether or not it is needed or wanted for plant and animal productivity. It is difficult to direct sulfur "benefits" to the 34 million acres of cropland (*1*) while excluding the remaining 180 million acres of forest, rivers, and so forth of the TVA region. It is impossible to prevent its export into regions outside the seven-state TVA region (*2*).

I know of no responsible person who advocates fertilizing crops with nitrogen through emissions from major NO_x sources rather than through the use of specially formulated fertilizers applied at the proper time and place in the proper chemical form and amount. Similarly, the idea of supplying sulfur as an essential nutrient for certain crops grown in certain sulfur-deficient soils through broad-scale SO_x emissions is faulty.

The *Science* article fails to point out that the same TVA plants which emit "enough sulfur to nourish crops in the region" also export considerable amounts to other areas where it may not be welcome. It is known that SO_x precursors to acid rain specifically and to atmospheric deposition in general often originate hundreds of kilometers away from their points of deposition. This makes it difficult to be very precise about giving just the right dose of sulfur for a particular crop in a particular region.

The notion that it is essential or desirable or even marginally acceptable to continue supplying sulfur indiscriminately by using polluted air masses instead of fertilizer is just that—fertilizer!

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References and Notes

1. Crop Reporting Board, *Acreage* (Economic Statistics and Cooperative Service, U.S. Department of Agriculture, Washington, D.C., 1978).
2. Kentucky, Tennessee, Alabama, Georgia, Mississippi, North Carolina, and Virginia have some 33.8 million acres under cultivation within the seven-state TVA regional boundary.

Fusion: Funding Alternatives

Basic research in the Magnetic Fusion Energy program will be severely curtailed by a bill from the House Science and Technology Committee. The bill explicitly defines the basic research area of "Alternate Concepts," and as a result, 50 percent of the nation's university research in alternative plasma confinement methods will be cut. We personally believe the congressional action is unwise. Technical decisions on how best to develop controlled fusion energy should be made by the scientific staff of the Department of Energy (DOE), who interact with scientists in the field to continuously assess the impact of scientific research on the overall program.

Among the effects of the congressional decision will be the elimination of the successful experiments at universities on the use of ion and electron beams to create toroidally confined plasma rings. This is occurring despite the interest of the national laboratories, who have initiated or are planning similar experiments in an attempt to produce a more compact version of the most successful fusion experiment, the tokamak.

Another example of the committee's misconception of the field is that the initial draft of the bill called a halt to work on "plasma turbulence." The tokamak is the leading fusion device, but its plasma confinement properties are governed by plasma turbulence. The theory of these processes needs further development and is a central issue in the controlled fusion program.

The impact of the congressional dictates on creativity and morale in the university community is profound. University research is inexpensive in terms of the engineering and equipment it needs, but invaluable as a source of new ideas, objective input to the national program, and teaching of graduate students who will enter the fusion program. The cuts represent an immediate loss to the program of about 20 professorial staff and their students and will discourage many more from entering the field. The action of the Appropriations Committee is surprising because it has previously strongly supported the fusion program and because it is in conflict with the presidential policy of stimulating basic research. DOE's own recent policy, announced by Under Secretary John Deutch, recommends increased effort on alternative confinement schemes as well as a strong emphasis in the main-line areas.

We strongly urge that Congress reevaluate its actions. The need for basic research in controlled fusion is of high priority and should not be forgotten in the desire to accelerate the development of a practical power source.

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