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LETTERS

Herbicide Orange Surplus

I would like to provide an addendum to Deborah Shapley's report "Herbicides: Agent Orange stockpile may go to the South Americans" (News and Comment, 6 Apr., p. 43).

IRI Research Institute's (1) interest in herbicides and brush control problems dates back nearly 20 years. A brush control project was initiated in 1954 at the request of Brazilian farmers, whose pastures were being invaded and overrun by noxious species of tropical brush including indigenous poisonous species. Experimental work was initiated to control a number of these species of brush such as "Leiteiro" (*Tabernaemontana fuchsiae*) and "Amendoim" (*Pterogyne nitens*), and more than 2000 field plots were established in Brazil and Venezuela. The results of these studies and observations were published in four different bulletins and technical notes in English, Portuguese, and Spanish (2).

The basic ingredients of Herbicide Orange, 2,4-D and 2,4,5-T, have been sold and used commercially in Latin America for more than 20 years. These chemicals have controlled brush well in field applications and have improved pastures. However, their high cost has limited their use, and the surplus Herbicide Orange offers an opportunity to make some substantial improvements in pastures and livestock production at a significant saving to livestock producers.

There is a potential health hazard with the use of all agricultural chemicals. However, the possible hazard depends largely on how and where they are applied. The military applications of herbicides are reported to have been in the range of 27 pounds per acre, whereas the recommended applications to control pasture brush would be about 1 pound of 2,4,5-T per acre. Thus, the dosages are not comparable. Even common table salt can be a toxic and poisonous substance if taken at sufficiently high dosages.

It was found in the experimental studies that the most effective brush control in the tropics was obtained when herbicides were applied during the warm, wet season. These conditions are optimal for accelerated biodegradation, which would minimize the residue problem. Also it was found that the best results were obtained when animals were kept out of the sprayed pastures for 3 or 4 months following any spray

application. When the pasture grasses are not grazed and allowed to grow vigorously, they provide a type of biological control against the resprouting noxious brush species. Thus, by following these two procedures, there is only a minimum possibility that toxic materials will build up in the food chain.

The livestock industry in Latin America is located largely in remote areas and requires very little labor. Thus the potential human exposure in the field is at a minimum. To our knowledge there have been no injurious effects to men or animals resulting from the field application of these herbicides in Latin America.

If it is recognized that there are potential risks in the use of Herbicide Orange, the decision to use it is essentially a problem of balancing the risks against the benefits. Any risks can be minimized by proper handling and application. The proposed project includes an extensive educational and demonstration program to assure proper handling. A realistic value judgment overwhelmingly indicates that the results of the proper application of Herbicide Orange would be favorable.

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References and Notes

1. IRI is a nonprofit organization founded in 1950. The name was changed in 1963 from IBEC Research Institute to IRI Research Institute, Inc.
2. L. R. Quinn, K. L. Swierczynski, W. L. Schilman, F. H. Gullöve, *Experimental Program on Brush Control in Brazilian Pastures* (IBEC Research Institute Bulletin No. 10, New York, 1956); [*Programa Experimental de Controle de Arbustos em Pastagens Brasileiras* (IBEC Research Institute Bulletin No. 10, São Paulo, 1956)]; *Programa Experimental Sobre el Control de los Arbustos en los Pastizales Brasileños* (IBEC Research Institute Bulletin No. 10, New York, 1956)]; L. R. Quinn, *O Controle de Arbustos Nas Pastagens do Brasil* (IBEC Research Institute Nota Técnica No. 6, São Paulo, 1961); L. R. Quinn and J. B. Griffing, *O Controle do "Leiteiro" e do "Amendoim" em Pastagens* (IBEC Research Institute Miscellaneous Publication No. 2, São Paulo, 1958); C. E. Fisher and L. R. Quinn, *J. Range Manage.* **12**, 244 (1959); [*Contrôle de Três Espécies Importantes de Arbustos Pragaes em Terras de Pastagem nos Estados Unidos, Cuba e Brasil* (IBEC Research Institute Nota Técnica No. 5, São Paulo, 1959)].

Energy Policy

In the issue of 23 February, excerpts from a speech by S. David Freeman are presented (News and Comment, p. 779) in which "solutions" to the energy crisis are proposed.

Freeman's major thesis is that ending the import restrictions on energy fuels would alleviate the energy short-