Letters

Goldfarb's Thanks

After my arrival in New York (News & Comment, 31 Oct., p. 539), it was a pleasure to hold an issue of *Science* in which portions of the Briefings section were not removed by a censor, as they are in Moscow. It is from these blank spots as well as from visits and phone calls by my Western colleagues that I learned about the efforts on my behalf in the United States and Western Europe. But it was not until I was presented with a thick file of materials and correspondence that I realized the scale of this campaign.

I want to thank my colleagues for their help and support. Visits to my home by Benno Muller-Hill, Ekke Bautz, and Wolfram Zillig; letters written by André Lwoff, Bill Hayes, and Elie Wollman (*1*); and regular phone calls from Simon Silver were important for me not only as demonstrations of personal friendship but also as very persuasive arguments in my dialogue with Soviet authorities. On several occasions during the past 7 years, I had a chance to witness how the authorities and the bureaucracy of the U.S.S.R. Academy of Sciences softened their attitude to me as the result of this pressure. It was due to the strong stand of George Melchers that I was not removed from the editorial board of *Molecular and General Genetics* after applying for an exit visa in 1980. Telegrams and letters from my colleagues convinced the Soviet Academy to reemploy me as a consultant in my old institute from 1983 to 1984. The flow of inquiries about me on the eve of the Federation of European Biochemical Societies meeting in Moscow resulted in the Soviet Academy's attempt to resolve my case over the objection of the KGB in 1983. And most of all, the protests by my colleagues and the moratorium on sending bacterial strains to the U.S.S.R. organized by the Committee of Concerned Scientists in 1984 saved me from criminal prosecution for an "attempt to smuggle out of the country" a collection of *Escherichia coli* auxotrophs.

It is impossible for me to personally thank everybody involved in this campaign. Yet I hope I will be permitted to list the authors of the moratorium—Max Gottesman, Charles Yanofsky, Simon Baumberg, and Michael Yudkin—and the 16 signatories of the cable to the Soviet Academy (*2*) as individuals primarily responsible for the fact that officer Gusev of the Moscow KGB one day officially informed me that the charges against me were dropped.

Let me finish by saying that there are others left behind in Moscow. Among them are our fellow biologists Iosif Irlin and Valery Soifer. I hope that they will follow me soon.

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REFERENCES

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2. V. Rich, *ibid.* **309**, 104 (1984).

Alternative Crops

Noel Vietmeyer's article "Lesser-known plants of potential use in agriculture and forestry" (13 June, p. 1379) is a valuable survey of little-known plants with potential for agricultural development, particularly in the tropical countries. His suggestion that tapping these existing plant genetic resources can make as great a contribution as genetic engineering in solving world resource problems is sound. Unfortunately, however, Vietmeyer presents a view of tropical agriculture as a tabula rasa awaiting development by outside experts. The scientist's role is to improve the yield characteristics of individual crop species, which are then extended to the farmers for their adoption. This approach ignores the systemic character of tropical subsistence agriculture in which the acceptability of new crop species, however productive they may be on the experiment station, is determined by a complex set of social and ecological factors.

Benjavan and Kanok Rerkasem of Chiang Mai University in Thailand have shown (*1*) that each species, and indeed each variety within a species, must fit into an existing agroecological niche for acceptance by small farmers. In their study of the persistence of traditional rice varieties in the Chiang Mai Valley, the Rerkasems discovered that, despite government efforts to replace traditional varieties with genetically improved high yielding varieties (HYV's), yield was only one of many important niche parameters. In those areas where farmers grew garlic after rice, a traditional variety yielding large quantities of straw was retained, despite its low grain yield, because the high demand for mulch for the garlic beds made the straw nearly as valuable as the rice itself. In other areas, where farm plots were small and the farmers depended upon income derived from harvesting the fields of larger landlords, late maturation was the key niche parameter. This allowed time for them to complete harvesting the fields of others for wages before cutting their own grain. The HYV's could not satisfactorily fill such specialized niches and were therefore rejected in favor of the traditional varieties.

Another example is a study of traditional Javanese "homegardens" by Otto Soemarwoto and his colleagues of the Padjadjaran University Institute of Ecology in Indonesia. The homegarden is a complex agroecosystem with as many as 60 species densely packed into a small area, reflecting land shortages in overpopulated Java. An important strategy for maximizing production per unit area is to plant species that form a multistoried canopy with coconut palms (*Cocos nucifera*) as the emergent level. Without considering the niche assigned to coconut palms, development experts suggested distributing dwarf Samoan palms to the farmers. These palms bear at an earlier age, give higher yields, and are easier to pick than the tall variety. In the homegarden system, however, these advantages did not outweigh the disadvantage of the dwarf palm directly competing for space and light with other species.

One of us (P.E.S.) with colleagues at the University of Philippines at Los Baños found that even farmers' perceptions of legal codes for landownership affect species acceptance. Seeking to stabilize upland farming systems, the Ministry of Natural Resources distributed tree seedlings of *Acacia mangium, Leucaena leucocephala*, and *Mangifera indica* to Palawano farmers. Although these tree species were well adapted locally and offered free of charge, no Palawano farmer accepted them, believing that planting "government seedlings" gives the government title to their ancestral lands.

The explosive expansion of cassava (*Manihot* spp.) in northeastern Thailand in the 1960's, without government encouragement, offers an example of farmer adoption of a new species because it fits into an otherwise unoccupied niche. As has been shown by Terd Charoenwatana and his associates at Khon Kaen University, the introduction of cassava allowed farmers to grow a valuable cash crop on previously unused uplands without competing for the limited labor available to plant the subsistence rice crop in the lowlands during the brief rainy season.

These examples, multiplied many times from our colleagues' work in the Southeast Asian Universities Agroecosystem Network (SUAN), cause us to question the fundamental approach to agricultural research underlying Vietmeyer's article. Identifying new plant species having potential value and then having agronomists "improve" them will not, in our view, lead to solution of the problems faced by tropical subsistence farm-