larger share of its creative talent to basic agricultural research if it is to increase its favorable balance of trade in agricultural products, and he urges expansion of the USDA competitive grants program. I disagree, because it is notoriously hard to predict what benefits will come from basic research, when they will come, or who the beneficiaries will be. For example, basic research in the United States may have led to the transistor, but it is the Japanese who build the television sets and the transistor radios that now dominate the U.S. market.

To the extent that agricultural research has given U.S. farmers a competitive edge, it has overwhelmingly been applied research that has made the difference (for example, the development and testing of crop cultivars highly adapted to the particular climatic, edaphic, and plant pathological environments of major agricultural areas of the United States) rather than basic research.

Over the past 20 years, both the U.S. Department of Agriculture and the state agricultural experiment stations have decreased support for applied agricultural research in order to increase support for basic biological research that may or may not someday have agricultural relevance. An example is the relentless replacement of retiring plant breeders by biotechnologists and molecular biologists at land-grant universities throughout the country. Some valid arguments can be made for this change, but increasing the competitive advantage of U.S. farmers is not one of them.

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During the past decade, a vigorous debate about sustainability (*1*) has challenged the basic assumptions of the scientific and economic approaches to agriculture that have been dominant since the 1950s. Those arguing for more sustainable approaches have stressed that research and policy must include consideration of the social, environmental, natural resource, and health costs of modern agriculture (*2*).

While Abelson mentions the increasing importance of regional and global factors, he cites only economic pressures; he does not consider the urgent need to integrate research on agriculture, forestry, and fisheries at both national and regional scales in order to protect not only crop and tree germ plasm but biodiversity more generally (*3*).

In light of the Rio Earth Summit (the United Nations Conference on Environment and Development, held in June 1992 in Rio de Janeiro, Brazil), we should move away from the current research goal of increasing agricultural production to that of developing food systems that are environmentally sound and that can deliver food equitably over the decades and centuries (*4*). We should also move away from the "trickle-down" assumption that basic research in the natural sciences will increase production and quality, which in turn will solve our agricultural and trade problems.

Research should be promoted that brings together natural scientists, social scientists, and humanists to address the issue of sustainability. Yet, despite much lip service, USDA funding for research on sustainability, narrowly defined to natural science research, has received a low priority (*5*).

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Antibiotic Resistance

A point in Harold C. Neu's excellent article "The crisis in antibiotic resistance" (21 Aug., p. 1064) should be clarified with regard to resistance to tetracycline. First, the mechanism of resistance mediated by TetM is not efflux (*1*), as Neu states. Second, there are no data to support the idea that, in addition to efflux, resistance could be due to ribosomal protein alteration. Rather, investigators have pointed out the similarity of the sequence

of the TetM/O proteins to bacterial elongation factors, the implication being that the resistance protein may substitute for the cellular enzyme in some manner. We (*2*), and others (*3*), have shown that resistance mediated by TetM/O is due to a soluble protein that protects the translation machinery from the inhibitory effects of tetracycline.

Neu is correct in stating that the genes encoding the ribosome protection mechanism are prevalent among bacterial pathogens. This host range includes not only enterococci, where it can be shown to be present in more than 90% of all isolates, but also *Neisseria gonorrhoeae*, mycoplasma, ureaplasma, clostridia, bacteroides (*4*), and camphylobacter (*4*), where tetracycline antibiotics are normally clinically effective.

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Enigmatic Arctic Cloud Plumes

Cloud plumes of enigmatic origin that appear to emanate from around Bennett Island in the East Siberian Arctic were discussed in a Research News article by Richard A. Kerr (3 July, p. 35). Our letter of 30 October (p. 725) pointed out that the plume illustrated in the article was not coincident with the U.S.–Russian atmospheric sampling overflights this past April. Our letter also stated that satellite data archived by the National Weather Service (collected at the Gilmore Creek, Alaska, receiving station) did not contain images with clear plumes during this same period. However, data have subsequently been provided to us that were downloaded from a temporary receiving station set up for the U.S.–Russian sampling project. Those temporary station data show plumes occurring over Bennett Island that were coincident with the U.S.–Russian atmospheric sampling overflights. During these sampling flights no elevated methane concentrations were reported.

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