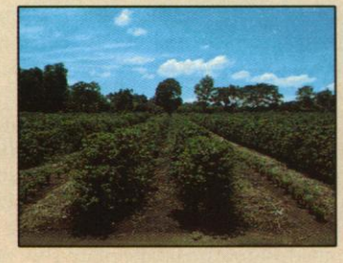
LETTERS

"Changing methods"

Steps toward dealing with the "clear and present danger" of radioactive materials left over from Cold War weapons are advocated. Readers respond to a news article about how the shift from "shade" to "sun" coffee plantations (at right) in Latin America and the Caribbean could be damaging to migratory songbirds. Bringing AIDS researchers together in a single institution is said to have led to "spectacular" results. A Swedish official says that research and education are "priority areas" for public funding in his country. And readers discuss a proposal to hold "all authors fully responsible" for a paper.



R. RICE/SMITHSONIAN MIGRATORY BIRD CENTER

Disposing of Excess Plutonium

Secretary of Energy Hazel O'Leary announced on 9 December that the Department of Energy (DOE) will pursue two technologies for disposing of excess military plutonium. The first is to mix the plutonium with highly radioactive waste and to "vitrify" that mixture into massive logs. The other is to convert it into plutonium oxide, mix it with uranium oxide, and fabricate it into mixed oxide fuel, or "MOX," for use in existing reactors operated by commercial utilities.

Both approaches face delays: the vitrification, or "throw-away," option needs further research and development to explore what quantity of plutonium can be vitrified safely; reactor "burn-up" of MOX is in use in Europe, but faces administrative delays in the United States. For technical reasons, some of the weapons-grade plutonium is suitable for vitrification, while plutonium withdrawn directly from the "pits" of nuclear weapons appears to be more suitable for reactor use.

The two-track approach has been criticized for two reasons. One ton of plutonium can generate 1000 megawatts of electricity for about 1 year, and some oppose throwing away that energy. Others assert that using plutonium as MOX in existing reactors constitutes a reversal of U.S. policy not to separate plutonium from civilian spent-reactor fuel.

Spent fuel from nuclear reactors contains a mixture of plutonium and highly radioactive fission products. Increased proliferation risk occurs if the plutonium is separated from this spent fuel by chemical reprocessing. Such plutonium can be used for nuclear weapons and, not being very radioactive itself, it is more susceptible to theft.

Russia and the United States have accumulated about 250 tons of weapons-grade plutonium by separating that material from spent fuel produced in specifically dedicated reactors. Worldwide civilian spent fuel contains nearly 1000 tons of reactor-grade plutonium which, while less desirable to a nuclear-weapons designer, can still make terrifying weapons; roughly 4 kilograms can make a nuclear bomb. Once plutonium has been separated from spent fuel, it must be safeguarded lest it fall into unfriendly hands. President Clinton has reverted to the policies of former presidents Ford and Carter and opposes reprocessing of civilian fuel; therefore, the United States is now pursuing the "once-through" fuel cycle, which I believe is the most proliferation-resistant and the most economical approach to nuclear energy today. The assertion by critics that disposition of existing plutonium in existing civilian reactors reverses existing policy is simply wrong.

Either vitrification with high-level waste or fabrication of the plutonium into MOX for use in civilian reactors results in a form that is proliferation resistant for a long time. The Russians object to any option that throws away the energy value of the plutonium and therefore they favor the reactor route. But all possible efforts should be made to prevent re-extraction of the plutonium from either spent reactor fuel or vitrified logs. We must cooperate with Russia and assist them in disposing of their plutonium so that these materials will never be used for weapons again. Any facilities built either in the United States or in Russia should be dedicated solely to disposal of excess weapons plutonium. The U.S. reactor option provides essential leverage in any cooperative effort with the Russians that induces them to focus their program on the arms control mission, that is, disposal of the excess plutonium.

For the above reasons, I strongly support the dual approach of the Administration (*1*). We need redundancy in case one approach

fails, and we need to minimize the risk of breakout from arms control agreements resulting from conversion of the weapons grade-material at least in part to reactor grade plutonium. We also need the dual approach to persuade the Russians to move rapidly to disposition.

We must unlink today's decisions about the management and disposition of excess plutonium from nuclear weapons from choices affecting the world's energy future. The DOE decision about the excess weapons plutonium deals with a "clear and present danger"; we have many decades to address future choices relating to civilian nuclear energy.

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Note

1. I am Chair of the Study on Management and Disposition of Excess Weapons Plutonium, Committee on International Security and Arms Control, National Academy of Sciences, Washington, DC.

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Eco-Friendly Coffee Farming

Laura Tangley accurately details the need for U.S. consumers to think about how their coffee is produced and the importance of "certified eco-friendly" coffee to the conservation of migratory songbirds ("The case of the missing migrants," (Research News, 22 Nov., p. 1299). However, we would like to make clear that our ECO-O.K. Coffee Certification Program requires that coffee be grown beneath a diverse canopy of native tree species. ECO-O.K. certifies either organic farms or those that use integrated pest management. When a producer must use agrochemicals to save his or her crop, our standards strictly control the transport, storage, and use of the chemicals, thus reducing threats to the environment and human health.

While forested organic coffee farms offer perhaps the best example of bird-friendly production, they occupy only a tiny percentage of coffee-growing lands. The Rainforest Alliance wants to promote large numbers of forested coffee farms in order to have maximum conservation impact. By pursuing this strategy, we believe that we can stop and perhaps even reverse the trend toward damaging, "full-sun" coffee fields.

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Tangley's commentary concerning the mounting deleterious impact of changing methods of shade usage, or lack thereof, in coffee plantations on migratory bird populations calls attention to my previously published data sets on cicada populations thriving in some Costa Rican coffee plantations (*1*, *2*). Costa Rican coffee plantations, in my experience, support several genera and species of cicadas of varying body size, behaviors, and seasonal emergence patterns. Furthermore, a large percentage of the total cicada fauna of Costa Rica (a total of about 30 species) thrives in those coffee habitats in which various legume trees—especially of the genera *Inga*, *Erythrina*, and *Pithecollobium*—are used as shade cover (*1*).

Repeated surveys of emerging cicadas in these coffee habitats reveal a discernibly patchy spatial distribution, as indicated by the locations of final molt–cast nymphal skins clustered near these shade trees rather than evenly distributed across the coffee bushes. Cicada nymphs drench sap subterraneously from tree roots for several years before maturing and emerging from the soil for the molt to the winged adult stage.

In some instances, the densities of cicada-cast skins in coffee habitats can be considerably higher than in comparable areas of adjacent wet or moist forest habitats. Such data suggest a larger biomass of adult cicadas being