cially consumers—will be necessary if we are to negotiate these difficult waters successfully.

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Plutonium's Existence

The article "No easy way to shackle the nuclear demon" (Science after the Cold War, 4 Feb., p. 629) by Gary Taubes states that plutonium is an element that did not exist on the planet before it was made in the laboratory in 1940. Plutonium (^{244}Pu) has existed in nature at low concentrations for eons (*1*). Primordial ^{239}Pu would have long since decayed into ^{235}U. Yet in uranium-bearing minerals small quantities of ^{239}Pu are formed by the action of natural neutrons on ^{238}U to form ^{239}U, which forms ^{239}Np through beta decay. After another beta emission, the ^{239}Np becomes ^{239}Pu (*2*). In fact, we now know the isotope ^{239}Pu was formed in natural reactors in western Africa almost 2 billion years ago (*3*).

Plutonium (later shown to be ^{238}Pu) was first isolated in trace quantities by Glenn T. Seaborg and his co-workers at the University of California, Berkeley, on 24 February 1941 (*4*). It was not until spring 1941 that ^{239}Pu, the fissile stuff of nuclear bombs, was isolated and identified at Berkeley. The element with atomic number 94 was not named plutonium until March 1942.

The article also states that all the isotopes of Pu are fissionable. However, of the 16 isotopes of Pu (*5*), only ^{239}Pu is fissile and used in nuclear bombs. The shorter-lived ^{241}Pu is fissile, but not of importance to nuclear bombs.

Finally, the article refers to tritium as being "short-lived." Actually, its 12.35-year physical half-life, although short by comparison with that of ^{239}Pu, is relatively long compared with the life-span of human subjects. For example, after 30 years, about 19% of tritium atoms still remain.

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Fusion Confusion

James Glanz, in his article "DOE lifts the veil of secrecy from laser fusion" (News & Comment, 17 Dec., p. 1811), refers to "Project Matterhorn" as the early name of the U.S. magnetic fusion program. That was the name of the (originally classified) magnetic fusion program at Princeton University, which became the Princeton Plasma Physics Laboratory. "Project Sherwood" was the overall name for the U.S. fusion program (*1*), which in the 1950s and 1960s was virtually all based on magnetic confinement.

The Princeton fusion program inherited its name (and some key players) from an earlier Project Matterhorn, which under the direction of John Archibald Wheeler studied some aspects of thermonuclear weapons. Although the name was an apt one, its origin is now lost. Likewise, the reason for "Sherwood" now seems to be lost, although it is most likely attributed to James Tuck, a member of the U.K. team at Los Alamos (1943–1945), who stayed on to help start the fusion studies there.

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Beef Quality

The Random Samples item "Designer cattle with ultrasound" (21 Jan., p. 327) describes attempts being made by researchers at Iowa State University and elsewhere to use ultrasound for grading cattle. However, contrary to what the article says, the major determinant of higher cattle price is increased intramuscular (not intermuscular) fat, which is known as "marbling" in the industry. Marbling can be poorly related to the palatability of beef (*1*), and the additional, trimmable intermuscular (seam) and subcutaneous fat that come with marbling reduce the efficiency of growth and the carcass value. Variation in tenderness is a concern of beef producers, but indicators other than marbling are needed to predict the palatability of meat (*2*).

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Future Energy Supplies

In his editorial "U.S. petroleum: Past and future" (21 Jan., p. 303), Philip H. Abelson argues for the development of new and admittedly costly recovery strategies to extract the last 100 billion barrels of oil from U.S. soil—the oil presently lying in small, isolated pockets of discontinuous fields.

By his own numbers, the current U.S. total oil requirement of 13.5 million barrels per day would be met for a mere 20 years more if that oil were extracted, at which point the United States would become totally dependent on imported oil, with the uncertainties that that entails for energy security. Of course, we could continue to put up with that insecurity and import oil to make that "last drop" stretch out a few years longer. But what is the point? Within a generation, the United States will have either to depend totally on imported oil (and natural gas) or it will have to change to the use of renewable forms of energy.

Wouldn't it be much smarter to take our limited research and development resources and put them toward developing the latter rather than throwing them away trying to get the very last drop of oil out of U.S. soil?

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As a participant in the upstream sector of the domestic oil and gas industry, I was pleased to read Abelson's customarily cogent comments regarding the present situation in petroleum. It would seem that if our government could