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Cover: Roughly 90 million years ago, this mouse-sized mammal from Mongolia scampered around the dinosaurs. Recent finds in China, Madagascar, and Greenland are shedding light on these important, but little-known, early mammals. (Photo: Ed Heck, American Museum of Natural History)
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Letters

Ins and outs of time

In "At the tone, the time will be . . ." (SN: 9/28/96, p. 202), you report that the National Institute of Standards and Technology (NIST) is going to boost the output of its atomic clock time signal transmitter by fourfold to completely cover the United States with the signal.

A far better solution would be to install four new transmitters of the same strength as the existing Fort Collins, Colo., transmitter. If correctly positioned, they could cover the entire United States, southern Canada, northern Mexico, Puerto Rico, and the Virgin Islands with no gaps.

An even better solution would be to piggy-back the time signal on the Global Positioning Satellite (GPS) signals. Those time signals may already be there. Has anybody in NIST checked?

Jay C. Wood
Fillmore, Calif.

According to Don Sullivan, chief of the time and frequency division of NIST, if four transmitters broadcast at the same frequency, the signal would cancel out in some places and add in others, giving very spotty coverage. If they broadcast at four different frequencies, clocks and other devices designed to set themselves to the signal would have to adjust to those frequencies. Sullivan estimates that the cost of building and maintaining additional sites would be prohibitive in today's funding climate.

— C. Wu

Today's communication satellites cover all parts of the earth. A time signal can be derived from them in the remotest corner of the globe, even in Florida. So why build a new transmitter to increase the signal—so that a wristwatch can pick it up?

Is this a good use of taxpayers' money?

Albert A. Feldmann
Seattle, Wash.

The current signal has a very low radio frequency, around 60 kilohertz, and can pene-

trate walls. Satellite signals, on the other hand, are in the megahertz to gigahertz range. Only unobstructed, outdoor antennas can pick them up. You'd have to connect your wristwatch to a dish on the roof.

All of NIST's equipment was Navy surplus, saving taxpayers an estimated \$1.5 million. It should cost about \$300,000 to install the equipment and to refurbish the site, Sullivan says, plus an extra \$10,000 a year for the added energy the bigger transmitter will use. — C. Wu

New twist on fossil fuel

Karen Chin's work on dinosaur droppings ("What the dinosaurs left behind," SN: 9/21/96, p. 186) raises a related question. Evidence from the late Cretaceous indicates that Earth's climate was quite warm then. Large dinosaurs apparently were widespread and numerous. The amount of methane gas they emitted must have been enormous.

Is it possible that the dinosaurs generated their own greenhouse effect?

Virgil H. Soule
Frederick, Md.