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LETTERS

Cooling down

Granted that "Tokamak makes hot news" (SN: 8/19/78, p. 116), cooler heads should prevail. The central reason for the focus on the deuterium-tritium fusion reaction is its low ignition temperature of about 50 million degrees Kelvin. The problem with commercial fusion reactors using this fuel is that tritium, which has a half-life of only about 12 years and therefore cannot be found naturally on earth in usable quantities, must be made from lithium. Lithium is in limited supply just as are fossil fuels, uranium and thorium — particularly low cost lithium from high grade pegmatite ores and saline waters. We are therefore back to a limited energy supply rather than the inexhaustible supply touted by the press releases.

The deuterium-deuterium fusion reaction, which is as inexhaustible as ocean water (as the news media apparently believe all fusion reactions are) has an ignition temperature of about 500 million degrees Kelvin. This higher temperature may not be achievable in a tokamak system.

The "infinite" energy resource of the future is still a long way down the technological road. Items about recent fusion progress have not managed to carry this cooler news message.

Richard D. Mathews
Philomath, Ore.

As the world turns

Your Astronomy issue (SN: 8/26/78) was fascinating. Particularly intriguing were the static earth theories. After all, one interpretation of the Michelson-Morley experiment is that no motion of the earth through an ether is detectable since the earth does not move. Enough of the Flat Earth Society! Let's hear it for the Stationary Earth Society!

Roger B. Clough
Rockville, Md.

A question of gravity

I wonder why "black holes" should have any more mass and therefore any more gravity (gravity \propto mass) than what they started out with. For example, if the sun became a black hole, its mass and therefore its gravity should be the same, though the density (mass per unit volume) would be very high. My basic question is: How does the black hole acquire the enormous gravity that is attributed to it? Perhaps some of your readers can educate this ignorant person if you will publish this letter in your magazine. Thank you.

N. D. Sadanandan
Chattanooga, Tenn.

(The increase in gravitational field strength comes about from compression. The smaller the volume into which a mass is compressed, the stronger will be the gravitational field near its surface. At a large distance things won't change much, but close by, weird things can come to pass. The calculation of the gravitational field in the immediate neighborhood of a black hole is extremely difficult—Einstein left 10 equations to Newton's one—but it is being worked on [SN: 7/19/75, p. 46]—D. E. T.)

SCIENCE SERVICE

More heat on the dinosaur debate

We were pleased with your three recent articles on the physiology of animals, living and extinct (SN: 4/8/78, p. 218; 4/15/78, p. 231; and 4/22/78, p. 260). However, there are some points which we would like to make on these articles.

Workers should examine the fossil record and living forms instead of relying on artificial models alone. For example, Spotilla's bulk homeotherm dinosaur models are interesting, but they do not necessarily reflect reality. More fruitful are studies by Taylor, Schmidt-Nielsen, and Robertshaw of living tropical endotherms which show that contrary to popular impression, large body size is helpful in coping with high temperatures. The low skin area relative to body volume and great bulk of body tissue (in which excess heat is stored) of large endotherms protects them from daily temperature changes. Elephants and rhinos benefit so much from this effect that they do not need fur nor rely on evaporative cooling. Most dinosaurs were tropical and, if endothermic, their large body size was highly advantageous.

The postulate of dinosaurian homeothermic endothermy elegantly explains all the physiological features of dinosaurs. It also accounts for the 140-million-year suppression of mammals by dinosaurs from large body niches and is fully consistent with the physiology of the living dinosaurs — birds. Indeed, no feature of dinosaurs is inconsistent with homeothermic endothermy. In contrast, no alternative theory of dinosaur physiology fully explains most, much less all, the physiological features of dinosaurs. Dinosaurian endothermy cannot be "proven" any more than we can prove the endothermy of Mesozoic or even Cenozoic mammals. Paleobiology is a study of probabilities, and the probabilities are overwhelming that dinosaurs were homeothermic endotherms.

Daniel J. Costanzo
Arlington, Va.
Gregory S. Paul
Baltimore, Md.

Solar constant: Angle vs. distance

In her opening statement on "Constant solar constant?" (SN: 8/12/78, p. 105), Susan West is saying, in effect, that our seasons would not change if the earth's path around the sun was a circle instead of an ellipse. Of course, the changing angle at which the sunlight strikes the earth's surface, and not the changing distance from the sun, causes seasonal changes. Besides, the sun is actually nearer to the earth during our winter than it is during our summer. Wouldn't it be interesting to be around in 20,000-odd years when the sun will be nearest during the summer? I wonder if anyone has calculated how much that will make the summer hotter and the winter colder?

M. P. Guillory
LaPlace, La.

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COVER: A dilated pupil is one of many effects—physical and psychological—that researchers are probing in their study of cocaine. One of the most socially desirable, (and expensive) illegal drugs, coke is believed to trigger specific types of hallucinations, according to recent studies. Just how potentially dangerous the drug may be, however, remains a mystery. See p. 187. (Photo: U.S. Drug Enforcement Agency)

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