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## Letters

### ELFin nonsense?

I was disturbed to read your unscientific article on "ELF: The Current Controversy" (SN: 2/14/87, p.107). It could have been called the Flat Earth Controversy or the UFO Controversy. For each of those things you can doubtless find some well-meaning but misled people to take an uninformed position.

The essence of risk understanding is to see whether the risk is even plausible when matched against the laws of nature. For starters, consider the following.

We are told that people whose houses (what part?) are within about 15 meters of wires designed to carry large currents suffer a fivefold increase in childhood cancer. A factor of five is a big thing. It's reasonable to ask whether it is even possible. First, we don't know whether the wires actually had large currents, only that they were designed for them. Second, we don't know what large means. Just to test plausibility, let's assume that large means 1,000 amperes — but remember that wires come in pairs with opposite currents. Again, let's be conservative

### This Week

- 196 Superconductivity: A Physics Rush
- 196 Louis de Broglie, 1892-1987
- 197 Amassing momentum for Mars
- 198 AIDS drug approved, vaccine tested
- 198 Thalidomide: Is there a silver lining?
- 199 Spending more for cleaner coal
- 199 Rift Valley fever: Long-distance diagnosis
- 199 Manic depression: A new gene defect
- 206 Coming — dietary aids to prevent cancer?

### Research Notes

- 200 Biomedicine
- 200 Earth Sciences
- 201 Physics
- 201 Science & Society

### Articles

- 202 On the Trail of Elemental Matter
- 204 Cloud Conundrums

Cover: This 250-kilometer-long plume was discovered by accident in 1983 in weather satellite imagery of Bennett Island in the Soviet Arctic. Since then U.S. scientists have found more than 200 additional plumes arising from the island. Researchers have some theories about the cause of these clouds, but more recent discoveries of similar-looking plumes emerging from Novaya Zemlya, a Soviet nuclear test site to the west, have them baffled. (Photo: NOAA/NESDIS)



### Departments

- 194 Science on the Air
- 194 Books
- 195 Letters

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and assume that the pair of wires is separated by 1 meter. Then the magnetic field 15 meters away will be less than 0.01 gauss. This field is about 1 percent of the earth's magnetic field, to which we are *always* exposed. To believe that an incremental field of less than 1 percent, part time, can cause a fivefold increase in cancer requires suspending belief in science. One can get fancier by saying that the power line is AC, and induces electric fields in the body, while the earth's field is DC, but that doesn't fly either. One induces comparable electric fields in the body by walking through the earth's field at a speed a good deal less than 1 mph, and children are faster than that.

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I suspect that many scientists regard studies on the biological effects of extremely low-frequency (ELF) electromagnetic fields with some of the same skepticism they normally reserve for studies on ESP. This may result from a perception that such studies do not always seem to include good control groups.

One study that addresses this problem was carried out in Sweden by Nordstrom, Bike and Gustavsson. It documented the abnormal pregnancies among the wives of 542 workers at electrical substations. The first observation, that the wives of workers exposed to high voltages had more problem pregnancies than those of office workers, suffers from the usual difficulty: The two groups of workers may have differed in ways other than their exposure to ELF. However, the researchers went on to compare the wives of two groups of switchyard workers who appeared to differ only in the voltage of the power lines with which they worked. The wives of the workers exposed to the higher voltages had significantly more problem pregnancies than the other wives.

In the Soviet Union, where such effects are taken very seriously, it has been shown that electromagnetic fields can damage rat sperm. Thus a possible mechanism for the problem pregnancies exists.

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MARCH 28, 1987

195