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Excess lead: Its evolving definition

Last year the Centers for Disease Control (CDC) revised downward its definition of "an excessive absorption of lead" by children, the most susceptible population – from 30 micrograms (μg) of lead per deciliter (dl) of blood to 25 μg/dl (SN: 2/16/85, p.103). But already experts within the Environmental Protection Agency (EPA) and its panel of outside advisers are recommending reducing that level further – perhaps by 60 percent. Such a move would increase the percentage of U.S. children defined as carrying an excessive body burden of lead from 25 percent to more than 88 percent, explains Ellen Silbergeld, a lead toxicologist with the Environmental Defense Fund in Washington, D.C. Moreover, she adds, it would put 77 percent of adults in that category.

Based on a wealth of new studies, an internal EPA staff report has proposed to the agency that it consider any blood-lead levels above 10 μg/dl as excessive, according to Ronnie Levin, one of the report's authors. And, notes EPA spokesperson Dave Ryan, EPA's Clean Air Science Advisory Committee of outside experts "has recommended that U.S. blood-lead levels be reduced below 10 μg/dl."

Among the studies prompting a possible redefinition of excessive lead, Silbergeld says, are those by researchers with the U.S. Public Health Service and at Harvard University, showing that blood pressure in men increases as blood lead increases from 10 to 20 μg/dl. A study published in the March 1986 PEDIATRICS reported an apparent "linear relationship" between elevated blood lead – going down to 7 μg/dl – and diminished height in children, according to Joel Schwartz of EPA, one of the authors. Moreover, notes Schwartz, there are studies showing IQ deficits among children whose blood-lead levels are under 20 μg/dl. Finally, a study has correlated both lower birthweight and slower childhood neuromotor development for blood lead below 10 to 15 μg/dl (SN: 9/13/86, p.164).

Officials at the Atlanta-based CDC, which issues the lead guidelines independently of any other agency, are less convinced that the new studies prove "clear adverse health effects" below 25 μg/dl, according to Vernon Houk, head of CDC's Center for Environmental Health. However, he adds, "I have not reviewed recently all of that [low-dose] data." Within the next year, though, he plans to convene a panel to review the data "and see if we need to make changes" in the CDC guidelines. *– J. Raloff*

Antarctic dinosaur fossil

Scientists working with the Argentine Antarctic Institute report they are the first to discover a dinosaur fossil in Antarctica. Until now, paleontologists had found dinosaur remains on every continent except Antarctica, where conditions make it difficult to hunt for fossils. This find confirms the assumption that dinosaurs were distributed worldwide, says Nicholas Hotton at the National Museum of Natural History in Washington, D.C. It also helps bolster the relatively small collection of fossils from the Southern Hemisphere.

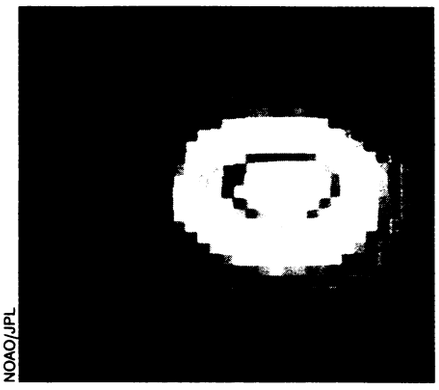
According to an Argentine press release, the 70-million-year-old fossil fragments belonged to a small, armored herbivore of the order Ornithischia. The fossil shows that Antarctica was warmer when the animal lived than it is today, according to the Argentine scientists.

Bones, plates and a skull of the dinosaur were found on James Ross Island, which is near the tip of a peninsula that juts out toward South America. According to Hotton, the discovery may put some constraints on the location of Antarctica 70 million years ago: If the fossil is shown to be related to other dinosaurs that lived in South America at that time, it will support the idea that Antarctica and South America were once linked. □

Enormous stellar shell raises theoretical questions

Stars tend to lose material to the space that surrounds them. Some of this loss is gradual and continuous – the so-called stellar winds. Some is abrupt – the sudden blowing off of a surface layer that then forms a shell around the star. A group of astronomers now reports in the Nov. 15 ASTROPHYSICAL JOURNAL the discovery of an especially large, cool shell around the star R Coronae Borealis. How this shell was formed and what makes it glow are both mysteries for which current theory does not seem to have answers.

Many stars that throw off their outer layers form planetary nebulas, more or less spherical clouds of ionized gas inside which the parent star resides. This shell, composed of carbon or silicate grains, is about 100 times the size of an ordinary planetary nebula. The R Coronae Borealis shell is 8 parsecs or 26 light-years across, about 20 times as large as any shell previously found around a late-type star such as this. One of the discoverers, Frederick C. Gillett of the National Optical Astronomy Observatories' Kitt Peak National Observatory in Tucson, Ariz., points out that if the sun were in the center of this shell, the shell would encompass not only the sun's planetary system but also about 50 of the nearest star systems. Other members of the observing group are Dana E. Backman of Kitt Peak, Charles Beichman of the Jet Propulsion Laboratory in Pasadena, Calif., and Gerry Neugebauer of Caltech in Pasadena.



NOAO/JPL

R Cor Bor shell from infrared data.

The astronomers believe that the shell is the result of some process of mass expulsion that took about 125,000 years and ended around 25,000 years ago, but they are not sure quite what that process was. Currently stars like R Coronae Borealis appear to be losing mass gradually. This is something of a contradiction to present theory, which expects that such stars should lose their hydrogen-rich outer layers abruptly as their central nuclear fusion mechanism starts to burn heavier elements. However, according to the nature of the shell as revealed by observations of the Infrared Astronomy Satellite, this gradual process as seen today cannot completely explain what happened in the distant past to R Coronae Borealis. "Therefore, the process that built the extended shell had to be different from the one going on today," Gillett says.

These stellar shells usually glow. They absorb radiation emitted by the stars in their centers or from the ambient "radiation field," the total contribution of other nearby stars. The radiation heats them until they glow, usually in the infrared. However, in this case, heating from the central star would be adequate only if the dust in the shell had a peculiar composition and unusually small grains. Ambient radiation doesn't seem to provide enough either, so the source of the heat remains a puzzle.

Another puzzle is that, while such a shell *should* be mostly hydrogen, so far the observers have not seen any. In this range of the spectrum, evidence of hydrogen is hard to pin down, but they are looking for it. *– D. E. Thomsen*