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## Letters

### New view of old figurines

In regard to "Return of the Stone Age 'Antiques'" (SN: 2/19/94, p.126), I would like to suggest that the so-called Venus figurines were simply erotica.

P.M. deLaubenfels  
Corvallis, Ore.

### Airing views on mercury

In "Mercurial airs: Tallying who's to blame" (SN: 2/19/94, p.119), J. Raloff states that "because incinerators emit an extremely soluble form of the metal, most of the mercury they discharge can wash out of the air — and into the food chain — more effectively than can the mercury released by power plants."

What is this extremely soluble form of mercury metal?

David S. Crockett  
Associate Professor of Chemistry  
Lafayette College  
Easton, Pa.

### This Week

- 308 Opening a Quantum Door on Computing
- 308 Nicotine — chewing on it
- 309 Blocking an enzyme prevents HIV infection
- 309 Brain images delve into hyperactivity
- 310 Faults found at Nevada nuclear waste site
- 310 Beta-carotene may lower vitamin E stores
- 311 Studies suggest galaxies formed very early
- 311 Detecting asthma before the last gasp

### Research Notes

- 319 Biomedicine

### Articles

- 312 The Pulse of *T. Rex*

Cover: How long could the dinosaur *Carnotaurus* chase a tasty prey before having to take a breather? While paleontologists have long argued about the physiology of dinosaurs, new work may soon answer whether these reptiles were warm-blooded, cold-blooded, or something completely different.  
(Sculpture: Stephen Czerkas, Monticello, Utah)

- 314 The Great Nicotine Debate

### Departments

- 306 Books
- 307 Letters

Science Service, which publishes SCIENCE NEWS, is a nonprofit corporation founded in 1921. It gratefully accepts tax-deductible contributions and bequests to assist its efforts to increase the public understanding of science, with special emphasis on young people. More recently, it has included in its mission increasing scientific literacy among members of underrepresented groups. Through its Youth Programs it administers the International Science and Engineering Fair, the Science Talent Search for the Westinghouse Science Scholarships, and publishes and distributes the *Directory of Student Science Training Programs for Precollege Students*.

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*Mercury emissions from combustion are gaseous and can take any of three major chemical forms: elemental, ionic (2+ and 1+), and organometallic (methyl). Though quite soluble and the most toxic, methylmercury appears to be relatively rare as a directly emitted combustion pollutant. The highly insoluble elemental mercury is the most prevalent form emitted by burning fossil fuels.*

*This mercury can travel long distances before it oxidizes to the highly soluble ionic forms — through reactions with ozone or other pollutants — and washes out of the air. Plants can absorb mercury directly from the air and eventually deposit it in soil as leaf litter. Once in soil or water, mercury becomes subject to bacterial methylation and uptake by the food chain. Recent research has shown that a large share of the mercury that incinerators emit leaves smokestacks in the oxidized (ionic) forms — primarily mercuric chloride, notes environmental chemist Gary E. Glass of the Environmental Protection Agency in Duluth, Minn. This is instantly available to wash out in rain or fog and undergo methylation.*

— J.A. Raloff

**The EPA credits** dentistry with using 30 tons of mercury annually for filling material ("More illuminating statistics on mercury," SN: 2/26/94, p.142). This is in contrast to estimates in the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION that 70 to 100 tons are used each year in North America. It would seem that dentistry is contributing to our environmental mercury problems far more than the EPA considers.

The Swedish government agrees with this assessment. It announced that it was phasing out amalgam fillings, beginning in 1995. This decision was based entirely on amalgam's environmental impact, which would presumably be greater in years to come than it is today.

H. L. (Sam) Queen  
Colorado Springs, Colo.

**Rather than condemning** mercury emitters, EPA should rectify a claim that only 40 percent of the mercury in air can be traced to natural sources.

Letters continued on p.317

MAY 14, 1994

307

Mele, a coinvestigator at Philip Morris' short-lived behavioral pharmacology laboratory in Richmond, Va., appeared before the subcommittee to discuss their nicotine studies.

While saccharin and water can set up reinforcing behavior, DeNoble said, they do so only if an animal can taste the saccharin or is thirsty for water. What sets addictive drugs apart is that brain chemistry drives the reinforcing behavior. Thus, intravenous injections of an addictive substance — which can't be tasted or felt in the tactile sense — will satisfy the brain's craving.

DeNoble said his work demonstrated that, like heroin and cocaine, intravenous nicotine satisfies such a craving. Moreover, he and Mele used a series of chemicals that block certain drug receptors in the brain "to show that it was the brain activity of nicotine . . . that determined its reinforcing effects." That's what makes intravenous self-administration of nicotine by animals — as demonstrated by DeNoble and Mele — "a hallmark" of addiction, observed NIDA Director Alan Leshner in an April 13 letter to Waxman.

And what of the tobacco companies' claim that DeNoble's work indicated nicotine is not addictive?

"When you talk about addiction, you're talking about a human condition," DeNoble says. Animal studies, especially the preliminary ones his lab conducted in the early 1980s, could not establish whether a substance would prove addictive, he says. Indeed, his lab was unable to establish that discontinuing nicotine could induce withdrawal symptoms. Those findings would come later, DeNoble testified, from labs that used more sensitive screening techniques.

However, he pointed out, his lab's groundbreaking work on self-administration by rodents "clearly shows that nicotine is an intravenously delivered reinforcer." And that, he emphasized, "is a

characteristic of a drug of abuse." As such, he testified, his work indicated the potential for nicotine to be addictive in humans. And work since 1984, DeNoble said, has established "an overwhelming body of evidence that nicotine does produce an addiction in the human."

How much of this did company officials know, Waxman and others asked? "Senior research management in Richmond, Va., as well as top officials at the Philip Morris Co. in New York continually reviewed our research and approved our research," DeNoble said.

But were they specifically told about nicotine's potential addictiveness, the subcommittee asked? Yes, DeNoble and Mele said — and that appeared to be why the company asked them to pull two manuscripts and a poster paper that had been approved for publication.

"It had to do with the fact that this would not look good in current litigation," DeNoble recalled — litigation in which admitting nicotine's addictiveness would undercut claims that people could voluntarily quit smoking any time they learned it might harm their health.

Indeed, DeNoble and Mele recalled that at least three attorneys descended on the lab for days, sifting through their research files, photocopying documents and data. Two months later — in November 1983 — the company's president-CEO and a lawyer from its New York office visited their lab. After DeNoble and Mele demonstrated a rat self-administering nicotine, the CEO asked if this indicated that the drug was addictive. DeNoble told him such behavior only suggested the drug's potential for addictiveness. That prompted the lawyer to ask if the test they had just witnessed was one a government agency would use to demonstrate addiction. DeNoble says he answered, "It's the exact procedure that NIDA would use to demonstrate abuse liability, yes."

At about this time, officials at the company's Richmond research facility began talking about shutting down the

nicotine pharmacology lab it had asked DeNoble to establish only 3 years earlier. But because the officials thought the nicotine work ought to continue, they considered having the pharmacologists set up as independent contractors in the Richmond area, the researchers testified. However, DeNoble recalled, "that really [wouldn't] remove [the studies] from the company as much as they would like, so they talked about sending us to Lausanne, Switzerland, to a contract facility"

**S**ince cigarette companies have the technical know-how to eliminate nicotine, why don't they? It provides "an important flavor to me," explains Alexander W. Spears, chief operating officer of the New York City-based Lorillard.

But other, nonaddictive compounds could provide the same biting, acrid flavor, so why not use a substitute and "take the nicotine out of the product," Synar asked.

"Why should we take the nicotine out?" Spears responded. "It is integral to the product."

Waxman proposes either requiring manufacturers to take nicotine out or putting a label on cigarette packs warning against nicotine's addictive properties — something he says the industry has successfully lobbied against in the past.

New legislation would also step up policing of cigarette sales to minors. Figures from the Centers for Disease Control and Prevention indicate that about 75 percent of smokers become addicted by age 18 — before it is even legal for most of them to buy tobacco products.

Contending that cigarettes are "the single most dangerous consumer product ever sold," Waxman argues that such moves would constitute pretty tame medicine. □

*Next: Chemicals That Manufacturers Add to Cigarettes*

### Letters continued from p.307

The major emitters of mercury are soil and vegetation evapotranspiration, followed by all kinds of combustion (household fires, forest fires, slash-and-burn clearing of land, brick-making, and, last, power plants).

One ton of mercury emissions per day is nothing compared to over 100 tons per day from all global sources.

*Evaldo L. Kothny  
Walnut Creek, Calif.*

### Hidden risks of testicular cancer?

In the sidebar to the article about testicular cancer ("Manhood's Cancer," SN: 2/26/94, p.138), there was posed the question of why such cancers are occurring more frequently since the early 1940s. I suspect that the cause is related to the reduction in sperm counts observed in recent years.

I suggest that both phenomena are related to the switch during the past 40 years from loose (boxer) underwear to tight (jockey) underwear worn by men.

*Loy Wiese  
Berkeley, Calif.*

Since professional and white-collar occupations tend to be sit-down occupations, I am moved to wonder whether the true risk factor for testicular cancer is not a period of elevated testicular temperature and to ask whether anyone has compared the incidence of testicular cancer in wearers of jockey and boxer shorts.

*Thomas A. Easton  
Belfast, Maine*

### No chance of bias

I would like to respond to Warner Clements' charge ("Questioning psi-ence," SN: 3/19/94,

p.179) that subjects' preferences for particular targets in the ganzfeld ESP experiments reviewed by Bem and Honorton would raise the probability of .25. This is impossible.

If a sender has a preference for one of the targets in a four-item target pool, the probability that that target will in fact prove to be the actual target is still .25 because the targets are selected randomly. The sender is not free to select whatever target he or she finds most appealing, as is implied in Clements' letter. Thus, any common bias the sender and receiver might have for a particular target cannot raise the probability of a hit above chance.

*Douglas M. Stokes  
Wayne, Pa.*

### CORRECTION

In "Radar paints land with colors of life" (SN: 4/23/94, p.263), the two radar images are reversed.