

The adventure of the China White

Clandestine operations have kept the chemical Sherlocks of the Drug Enforcement Administration busy for the past several months. In early November, California officials found a tiny packet of white powder on the body of a drug overdose victim. Preliminary analysis indicated that this mysterious powder was new to the marketplace of illegally manufactured drugs. So the DEA launched an investigation aimed at identifying the components of the drug, which is sold as "China White," a very pure form of heroin. Using the latest techniques available to forensic chemists (SN: 7/19/80, p. 44), DEA officials recently discovered that the imposter China White is the drug fentanyl—a component of a generic product prescribed as a painkiller—with an additional methyl (CH_3) group. Fentanyl is estimated to be 80 times stronger than morphine, the active ingredient in heroin. DEA officials believe the drug is circulating throughout the western United States and is manufactured in southern California.

Cancer-causing food additive

That a cancer-causing substance has been among the fizzes and sundaes that have crossed soda fountains since the 1940s is hard to swallow. According to results of recently released tests conducted for the National Toxicology Program of the National Cancer Institute, however, it is true. A synthetic flavoring agent that has been used for nearly 40 years as an imitation grape or cherry flavor has been found to cause cancer in rats and mice.

The flavoring agent, cinnamyl anthranilate, is used in beverages, ice cream, candy, baked goods, gelatins, puddings and chewing gums at concentrations of 1.7 to 730 parts per million. It also is used as a fragrance in soaps, detergents, creams, lotions and perfumes in amounts ranging from 0.001 to 0.08 percent.

In the animal studies, the compound was tested at dosages of 30,000 and 15,000 parts per million. At the higher dose, liver cancer was found in 79 percent of the male and 67 percent of the female mice, and kidney and pancreatic cancers were found in 8 percent of the male rats. At the lower dose, cancers occurred in 60 percent of the male and 41 percent of the female mice and 6.7 percent of the male rats. Under test conditions, cinnamyl anthranilate was not carcinogenic in female rats.

These test results are being reviewed by the U.S. Food and Drug Administration, which will propose in the next several weeks an approval, ban or regulation of the use of cinnamyl anthranilate.

Chemistry capsules

- The poisonous gas carbon monoxide may be useful in treating sickle cell anemia (SN: 12/13/80, p. 379). U.S. Environmental Protection Agency researcher M. Jean Wiester reported at the recent meeting in Toronto of the American Physiological Society that red blood cell sickling is significantly decreased when a certain amount of the hemoglobin within the red cells carries carbon monoxide. Apparently, when the carbon monoxide, like oxygen, binds to hemoglobin, the gelling of hemoglobin molecules that results in red cell sickling is inhibited. Wiester says that while the poisonous carbon monoxide alone was not a reasonable treatment in her study, it may prove useful in combination with other forms of treatment.
- An Indiana University chemist has discovered how to synthesize quassin—a crystalline compound found in certain South American plants that can use the substance to make bruceantin, a potent antileukemia agent. Paul A. Grieco tackled quassin's synthesis, reported in the Dec. 3 JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, to improve his chance of conquering the synthesis of bruceantin.

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Jupiter's magnetotail: On the wide side

The vast domain encompassed by the magnetic field of Jupiter has been called "the largest structure in the solar system," filling more space even than the sun itself. Four spacecraft—two Pioneers and two Voyagers—have flown through it, and although their crossings add up to only an extremely sketchy view of the field's shape, some researchers have speculated that the field's "tail" could be as wide as 400 times the radius of the giant planet. And it's l-o-n-g: In 1976, Pioneer 10 passed through a region where the abrupt disappearance of the solar wind suggested that the craft may have crossed Jupiter's magnetotail beyond the orbit of Saturn (SN: 4/3/76, p. 217)—10,000 Jupiter radii (R_J) away from the source. Now there is an indication that the Jovian field may spread out in other directions as well.

The major extent of the field—the axis, in other words, of the tail—is in an essentially straight line pointing away from the sun. The Voyager 2 spacecraft, after entering the field and flying past Jupiter in early July 1979, curved around behind the planet and finally exited through the "side" of the tail several weeks later. If, as assumed, the tail is shaped roughly like a cylinder, the location of the exit point (279 R_J from Jupiter and at about a 45° angle from the tail's axis) suggests the radius of the cylinder to be about 200 R_J , or 14 million kilometers.

Analysis of Voyager 2's plasma and plasma-wave data, however, now shows that about a month and a half after leaving the tail, the spacecraft seemingly passed again through Jupiter's magnetosphere, even though it was by now 706 R_J from the planet and about 500 R_J from the axis of the tail. One interpretation of this, according to William S. Kurth of the University of Iowa and colleagues, could be that the tail had simply grown temporarily to be about three times fatter. This might be possible if the solar wind, which normally blows the tail back into its cylindrical shape, had slowed down enough to let it expand outward into a flaring skirt. Or, the tail could simply have been "blown" sideways by a high-speed solar-wind stream. (Signs of such lateral movement have been detected in earth's magnetic tail by the Explorer 35 satellite, Kurth notes.) Still another possibility is that the spacecraft crossed through a stray "filament" of the Jovian magnetic field, sticking out in a different direction from the main tail. Various researchers have raised the idea of filamentary structures in earth's tail (based on fluctuating particle spectra) and even around comets, where no magnetic-field measurements have ever been made but where bright, visible filaments have often been photographed.

Any of these explanations would suggest the need for better understanding of what shapes and shifts planetary magnetic fields, Kurth says, but there's yet another interpretation of the Voyager 2 data that would eliminate the problem—while creating another: Perhaps, he says, the probe's instruments were not detecting the Jovian magnetosphere at all, but some kind of highly unusual solar-wind activity that "mimics" the magnetosphere's behavior.

Shuttle monitor delayed

An instrument package developed by NASA to ride on initial flights of the space shuttle and to measure sources of contamination that could affect scientific experiments on later missions has now been dropped from the first flight to save weight.

The 363-kilogram device consists of 10 instruments in an enclosure that would be mounted inside the shuttle orbiter's cargo bay, monitoring the results of outgassing and other phenomena that could degrade optical surfaces and other equipment. Called the "Induced Environment Contamination Monitor," it is still expected to be flown on later missions, although, reports NASA, "plans are not yet complete."

25