

trochemical Co. site in Niagara Falls.

Among other findings by the State Assembly was a July 19, 1978 statement to Army Board of Inquiry investigators by Frank Ventry, a former heavy-equipment operator at the Love Canal dump. He described army personnel arriving in trucks and jeeps that several times unloaded sealed drums of materials to be rolled into the dump. But the army report issued one month later claimed there was no evidence to support such charges.

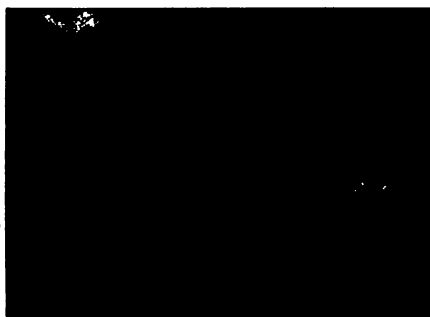
The State Assembly report described several other apparent ambiguities, and its researchers continue to sift through public records for further signs of government involvement.

"Hardcore evidence" proves DOD manufactured toxic chemicals around Love Canal and that the government transferred highly contaminated real estate to private companies after the war, says Andrew Roffe, attorney for the State Assembly. And, he told SCIENCE NEWS, circumstantial evidence, in the form of several eyewitness reports, documents the dumping of those chemicals. "What we want the government to tell us is if they didn't dispose of [those chemicals, as they claim], what did they do with them?" State Assembly hearings set for June 30 will further examine the record of federal involvement about Love Canal. □

## Food report: The fat's in the fire

Hold off on the bacon and eggs — the experts can't agree. The National Food and Nutrition Board's recommendations (SN: 5/31/80, p. 343) are being attacked on several fronts. The board's recent report said the evidence that cutting fat and cholesterol intake will reduce heart attack risks is insufficient to make a diet recommendation to the general public. The board chose to discount epidemiological evidence as not proving cause and effect. The American Heart Association and the Departments of Agriculture and Health and Human Services hold with their previous recommendations that people should cut down moderately on fat and cholesterol in the diet. John W. Farquhar, a member of the Nutrition Committee of the AHA, says the available data support lowering fat and cholesterol intake. He says, "... most groups agree it is not necessary to have all the pieces of the puzzle before one could devise coherent action." In addition, members of the Food and Nutrition Board are being challenged on their food industry affiliations. Chairman Alfred E. Harper, for instance, says he gets about 10 percent of his income from "industry consultantships," mainly from the Pillsbury Co. and Kraft, Inc. Another member of the board, Robert E. Olson, is an adviser and speaker for the American Egg Board and the Dairy Council of California. □

## Carminic acid as a chemical Judas



Photos: T. Eisner

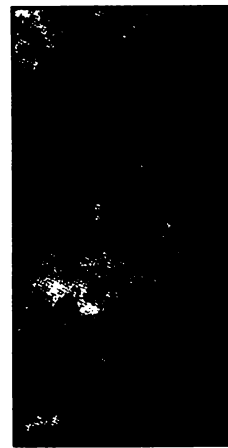
Carminic acid is a fickle chemical. Found in the blood and muscles of the scale insect *Dactylopius*, the red chemical seems to faithfully protect the insect from most of its predators — until the caterpillar of the moth *Laetilia* chooses to partake of *Dactylopius*. Then, carminic acid not only fails to deter feedings, but, upon ingestion, begins to function as the caterpillar's chemical defense.

Carminic acid's "defensive infidelity" was uncovered by Thomas Eisner and colleagues of Cornell University in Ithaca, N.Y. The compound, an important dye in the textile industry before aniline dyes ( $C_6H_5NH_2$  derivatives) were introduced, is a type of quinone — a six-carbon ring doubly bonded to two oxygens. Since other quinones — such as those found in millipedes — are potent feeding deterrents to predators, Eisner and colleagues expected the quinone carminic acid to serve a similar function in *Dactylopius*.

To test their expectations, the Cornell researchers — who report their investigation in the May 30 SCIENCE — devised feeding-preference experiments in which ants were offered a choice between sucrose solutions with and without carminic acid. Allowing the ants to determine whether carminic acid is a feeding deterrent was a "convenient and accurate bioassay," says research colleague Stephen Nowicki: "Ants represent very general predators; they will feed on just about anything they come across."

The results of all feeding tests — including one conducted in darkness to rule out the possibility of color discrimination — were unanimous: Carminic acid proved to be a potent feeding deterrent to ants.

Carminic acid betrays its apparent defensive function in *Dactylopius*, however, in favor of the *Laetilia* caterpillar. While examining *Dactylopius* colonies, Eisner and colleagues found the caterpillars feeding on the scale insects. Moreover, when gently prodded or pinched, the caterpillars emitted droplets of carminic acid at a concentration slightly higher than that in *Dactylopius*. A new series of ant tests indicated that the carminic acid in *Laetilia* also probably serves as a chemical defense.



The *Laetilia caterpillar* (left) responds to a forcep "attack" by regurgitating droplets of carminic acid. The winged male and newborn *Dactylopius* — *Laetilia* prey and provider of carminic acid — "hide" in the white, waxy powder and silken threads produced by the female.

"*Laetilia* is to be envisioned as an animal which, through evolutionary specialization, has managed to 'crash' through the defensive chemical barrier of its host, while at the same time appropriating the weaponry for protective purposes of its own," Eisner and colleagues report. □

## Adoptee study finds alcoholism genetic

While it may still be conceivable that a nagging spouse, a demanding job or meagre finances can drive a person to drink, accumulating research evidence strongly suggests that genetics is the overriding factor in many cases of alcoholism. University of Washington at Seattle scientists have reported that the offspring or siblings of alcoholics appear to react more acutely to alcohol than do other persons (SN: 1/6/79, p. 6).

Now, University of Iowa researchers report that youngsters born to alcoholic parents but reared by adoptive parents develop alcoholism significantly more often than do adoptees of nonalcoholic parents. "These findings suggest the importance of a genetic factor in alcoholism," report psychiatrist Remi J. Cadoret and colleagues Colleen A. Cain and William M. Grove in the ARCHIVES OF GENERAL PSYCHIATRY. The group found, moreover, that "none of the environmental factors — psychiatric or alcohol problems in the adoptive family, or exposure to discontinuous mothering as an infant — predicted adoptee alcoholism."

"If there are environmental effects [contributing to alcoholism], I don't think they've been demonstrated really well," Cadoret told SCIENCE NEWS. "In this sample, there is no evidence that environmental variables interact significantly with biologic variables to potentiate or ameliorate the risks of adoptee alcoholism due to a biologic background."

The research technique was similar to that used by Harvard psychiatrist Seymour Kety, who has reported apparent genetic as well as environmental components in schizophrenia and depression

among adoptees in Denmark (SN: 10/7/78, p. 244). The Iowa team followed 92 adoptees through young adulthood; the two groups were matched for age, sex, time spent in foster care and age of biologic mother at the child's birth.

Cadoret became especially convinced of a genetic component specific to alcoholism when he observed that a history of antisocial behavior on the part of the biological parents was a statistical predictor of a child's antisocial behavior, but not of a youngster's alcoholism tendencies; an alcoholic parent predicted an alcoholic

offspring but not necessarily an antisocial one.

The only possibly influential environmental factor, according to Cadoret, might relate to the finding that children who were antisocial as young adolescents often developed alcoholism as young adults — however, this may also suggest similar biological mechanisms involved in alcoholism and antisocial behavior, he says. "Many of these adoptees were well on their way to becoming alcoholics by the time they graduated high school," he says. □

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## More clues to rheumatoid culprits

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The cause or causes of rheumatoid arthritis, like those of most chronic diseases, have not been firmly pinned down. Yet the culprits underlying this devastating form of arthritis did appear to come a bit more into focus last week at the annual meeting of the Arthritis Foundation in Atlanta. For the first time, genetic markers for rheumatoid arthritis were linked with a particular chromosome, and a herpesvirus was indicted as a possible trigger for the disease.

Peter Stastny of the University of Texas Health Science Center in Dallas and his colleagues reported that they had studied 12 families with at least two rheumatoid victims in each family. (One family had six victims and another five.) Most of the rheumatoid patients in these families were found to possess a cluster of human lym-

phocyte antigens (HLA) already associated with rheumatoid — those coded by genes of the so-called D location in genetic material — and believed to reflect a genetic susceptibility to rheumatoid. Stastny and his team then found that the genes coding for these antigens are all located on chromosome number six.

Michael A. Catalano of Scripps Clinic and Research Foundation in La Jolla, Calif. and co-workers reported that they had found antibodies to Epstein-Barr virus in the blood of two-thirds of rheumatoid patients studied. (EB virus is a herpesvirus, the cause of mononucleosis and strongly indicted as a cause of two human cancers.) Before EB virus can be blamed for sparking rheumatoid, though, it must be found in the diseased joints of rheumatoid patients. □

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## Interferon studies disappointing so far

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Interferon's potential as a cancer cure may be proved eventually, but results so far have been less than fantastic. On the positive side, Hans Strander and colleagues of the Karolinska Hospital in Stockholm report that six of twelve patients with osteogenic sarcomas who were treated with interferon are now free of detectable cancer. Less optimistic results come from U.S. clinical trials.

At a meeting of the American Association for Cancer Research in San Diego last week, E.F. Osserman of Columbia University College of Physicians and Surgeons reported on preliminary results from a clinical trial that he and his colleagues set up under the auspices of the American Cancer Society (SN: 10/28/78, p. 295). Fourteen patients with multiple myeloma who had never before been treated for their cancer or who were in relapse after drug therapy received interferon daily for six months (unless their cancer was clearly progressing). To date, only four of the 14 have experienced substantial regression of their cancers. With drug therapy, Osserman says, cancer regression would have been expected in 11 out of 14 patients.

Also at the AACR meeting, tentative results of the ACS interferon trial against

breast cancer were presented. Patient eligibility was limited to women with objectively measurable breast cancers who had not received prior therapy. To date, 16 breast cancer patients have been treated with interferon from 42 to 84 days, and only five have responded.

Still a third batch of preliminary results was presented at the AACR meeting by Susan Krown of the Memorial Sloan-Kettering Cancer Center in New York City. Krown and her colleagues gave interferon to 16 lung cancer patients for 30 days. All but two had been treated previously with drug therapy. So far only 15 of the 16 patients have proved evaluable, and of the 15, eight have not changed, and seven have actually grown worse.

Nonetheless, the researchers participating in the interferon trials are encouraged that interferon has shown at least some anticancer activity. And as Frank J. Rauscher Jr., vice president for research at the ACS, points out, "The activity we have found warrants further testing and more precise, longer-term studies to find out how permanent are interferon's effects, exactly how it works, what are its side effects and what the optimum dosage should be." □

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## Venus: Know your neighbor

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There is more to Mars than Olympus Mons, spectacular as the gigantic volcano may be. Caloris basin is but a paragraph in the story of Mercury, and Mare Orientale is far less than all-revealing about earth's moon. As spacecraft photos of these worlds have shown, getting a sense of a whole planet in all its diversity requires a global view. And in the case of haze-shrouded Venus, such a view has been a long time coming. Earth-based radar has revealed small portions of the surface, but it is the radar aboard the Pioneer Venus orbiter that has finally given earthlings a planetwide portrait of their homeworld's nearest thing to a twin.

About 83 percent of Venus has now been mapped by the device, and data on another 10 percent are now being processed, which will leave only the polar regions uncharted. And in the global view, Venus is very much its own world.

Unlike the earth with its segmented crustal plates, Venus appears to be a "one-plate planet," with no sign either of equivalents to earth's mid-ocean ridges, where new crust is born, or of the subduction zones where old material from one plate is carried down beneath the edge of another. The reason, according to UCLA's William M. Kaula, may well be that loss (or lack) of water in the early Venus led to higher temperatures and thence to a more efficient settling-out of heavy, basaltic rock into the lower crust. This left a thick layer of lightweight, granitic rock at the top, which in effect "choked off" plate tectonics. Another way to put it is that about 84 percent of Venus may be wrapped in a single, planet-girdling continent, leaving only a small amount of low-level terrain equivalent to the ocean basins that cover five-sixths of the earth.

Atop this "super-continent," however, are a pair of huge highland regions, easily worthy by terrestrial standards of being considered continents in their own right. In the northern hemisphere is Ishtar Terra, as big as the contiguous United States, whose western portion is a vast plain known as Lakshmi Planum, the size of earth's Tibetan plateau and rising some 3,300 meters above "sea level." Running southwest-northeast across western Lakshmi is a mountain range, Akna Montes, joined at its northern end by an eastbound chain called Freyja Montes. Some of the great peaks reach as much as another 3,300 meters above the plain, yet they are dwarfed by a huge massif in eastern Ishtar, Maxwell Montes. Towering as much as 11,800 meters above "sea level," it is nearly two kilometers taller than Mt. Everest, and the radar data show the feature to have perhaps the roughest terrain on the planet, a sign that it could be volcanic.

Aphrodite Terra, the other major high-