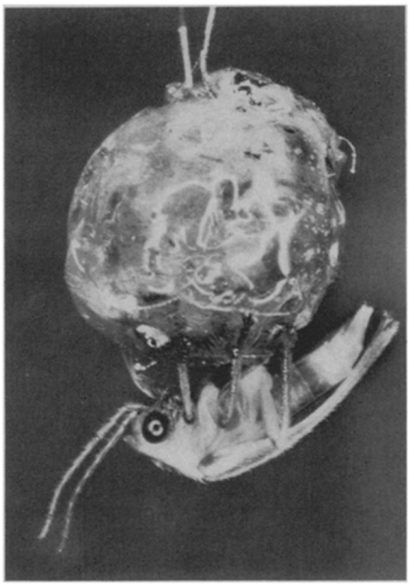
# Flashtrack: Firefly plays hawk

Female fireflies of several species have just been found to home in on the flashing lights of other fireflies, then attack for an airborne meal. It's the conceptual combination of the blinking neon "EAT" signs that attract truckers at night and inflight airline food service.

"These predators are the only known nocturnal, aerial hunters among the insects, and the only hunters to use the energy emissions of airborne prey for attack guidance," report James E. Lloyd and Steven R. Wing in the Nov. 11 SCIENCE. To further ensure successful hunting, a firefly sometimes combines this attack strategy with the ruse of flashing her own light in a pattern that attracts prey by mimicking a mating signal.

The firefly airborne attack strategy was discovered when scientists at the University of Florida in Gainesville swung light-emitting diodes in a circle through the air. A glowing diode was attacked by female fireflies of several *Photuris* species. When a dimly glowing, intermittently flashing diode was made to mimic the hovering approaches of "hesitant" males, females attacked within a minute. In some cases the female even gave an appropriate flashing response as she rose to attack from a perch in a nearby bush.

To be sure that the females meant business, the scientists attached live male fireflies to the diode. The attacking females ate these males. Usually if two females struck at the same time, they immediately separated. In one instance, however, one female ate the other.



Lloyd/Science

*An attacking female firefly sticks to a paste-covered 8-millimeter bead containing a light-emitting diode.*

The idea of a flash being a beacon to predators, as well as a sexual lure, may explain some puzzling behaviors of American fireflies. In two species, for example, the males drop to the ground, rather than directly approach the flash of a female. Among many American fireflies, the males use a quick flash as "the advertising signal," instead of the steady glow observed of fireflies in Asia, where flash-tracking predators have not been found. "The quick flash is harder to hit," Lloyd says. In a few American species, the males have given up luminescence altogether, relying on chemical signals for successful mating.

*—J. A. Miller*

# '1080' ban is repealed but not settled

The Environmental Protection Agency (EPA) last week repealed its 1972 ban on Compound 1080 (sodium fluoroacetate), a poison used to control predation of goats and sheep by coyotes and other wild dogs. The final administrative decision tendered last week by EPA Assistant Administrator Lee Thomas limits use of the chemical to incorporation in "toxic collars" (attacks on animals wearing them should rupture pocketed reservoirs of the chemical and poison attackers) and in single-lethal-dose baits of meat or tallow. The latter may contain no more than 5 milligrams of the poison and may only be used by certified state or federal coyote-control agents. This decision affirms, with some modification, a recommendation made last year by EPA Administrative Law Judge Spencer Nissen (SN: 11/6/82, p. 301).

(EPA Administrator William Ruckelshaus disqualified himself from the decisionmaking because of prior involvement in the case.)

Ranchers have protested that the poison's prohibition has had a severe economic toll on the woolgrowing and lambing industries (SN: 10/16/82, p. 248). Environmentalists have countered by saying that widespread and largely unrestricted use of this "supertoxin" (one teaspoon contains enough poison to kill 30 to 100 150-pound adults) can have a devastating effect on wildlife other than that targeted by ranchers and coyote-control agents.

Unhappy with EPA's new "final" decision, representatives of both constituencies have filed formal notice of their intent to challenge EPA's decision in the U.S. District Court of Appeals. The Pacific Legal Foundation plans to contest EPA's prohibition on 1080's use in large bait, and also some restrictions associated with the single-lethal-dose bait, according to Sam Kazman of the Foundation's Washington, D.C., office. Meanwhile, Defenders of Wildlife plans to argue that the new rule makes certification of bait applicators too lenient and enforcement of the collar's intended use almost impossible. *—J. Raloff*

# Vets mindful of herbicide's effects

During the 1960s, U.S. military forces dumped more than 50,000 tons of herbicide on the forests of Vietnam in an effort to eliminate enemy camouflage. The most widely used herbicide, well known today as Agent Orange, contained dioxin, an extremely powerful toxin that has been linked to a variety of physical problems in soldiers exposed to the spraying (SN: 9/3/83, p. 157). In recent years, Vietnam veterans have expressed additional concerns about the long-term psychological effects of exposure to Agent Orange, but the connection has never been scientifically investigated.

Now the first systematic psychological examination of two groups of Vietnam veterans offers a double-edged conclusion: While there appears to be no evidence linking actual exposure to psychological dysfunction, veterans who believe they were exposed are experiencing a host of mental and emotional problems.

University of Minnesota psychologists Gregory P. Korgeski and Gloria R. Leon studied 100 Vietnam veterans using a battery of psychological and neurological tests. Using information on where each subject had been stationed while in Vietnam, the researchers estimated the likelihood of each soldier's actual exposure by consulting Department of Defense spraying records. The subjects were then asked if they believed they had been exposed to spraying and, if so, if they thought they had been hurt by the exposure.

As the psychologists report in the November AMERICAN JOURNAL OF PSYCHIATRY, the veterans who believed they had been exposed to Agent Orange reported significantly more problems than the controls. Interestingly, their scores were elevated on every psychological scale — a pattern atypical of any diagnosable disorder — and they were no less successful than controls at either work or in their social lives. When the subjects who were actually exposed were compared to those who were not, no mental or emotional differences were apparent.

These findings might be interpreted in several ways, the researchers note. It may be that belief of exposure to powerful toxins causes stress, oversensitizing some to vague symptoms. Alternatively, they say, veterans who would have developed psychological problems in any case may simply blame a recognized agent. But because the distressed subjects were actually functioning well in everyday life, Korgeski and Leon prefer a third explanation: Those claiming exposure were probably more impulsive generally — a personality characteristic that would also make them more likely to complain of a variety of psychological and medical symptoms.

*—W. Herbert*