

## Wasting away in the SHADE

A device that can concentrate up to 10,000 gallons of radioactive liquids into a 30-gallon drum has been patented by Roger Black, a mechanical engineer at Argonne National Laboratory-West in Idaho Falls, Idaho. His Shielded Hot-Air Drum Evaporator — or SHADE — removes moisture from liquid wastes by repeatedly cascading them through a series of donut-shaped steel trays, housed in a 3-foot diameter metal drum. To promote evaporation, outside air is heated to 200°F and circulated through the SHADE. Two high-efficiency filters trap any particles that might try to leave the system as air exits through an attached exhaust stack. Roughly 5-feet high, the entire outside of the device is shielded in 6-inch high-density concrete.

Each SHADE is designed for one-time use. How long it lasts and how much it will process depend on the solids content of the liquids. "In an actual test, we've evaporated 10,000 gallons of radioactive liquids," Black says; that time it took a year and a half to fill its drum. But in another test, he says, the drum became 60 percent filled after cycling through only 110 gallons of liquids. Designed to process low-level wastes, SHADE could be upgraded for more-radioactive liquids. "It all depends on how much shielding you're willing to put on the outside of the drum," Black explains. Once a drum is filled with waste sludge, the device is capped with dense concrete and becomes its own shipping and disposal container.

Argonne-West has just installed a 60,000-gallon a year low-level waste facility that consists of six disposable SHADEs (and the permanent support equipment that goes with them—largely fans, controls and air lines). This week the \$2 million plant began processing its first liquids. Black says that although Argonne-West has gotten no firm licensing offers yet, industrial interest in the device is keen. Not only is it simpler, less expensive and able to triple the compaction of other conventional evaporators, but, he says, it is also potentially portable. In fact, Black is working on the design of just such a device.

## Defense wastes to get a salty bed

The politically controversial on-again (SN: 7/21/79, p. 38), off-again (SN: 2/16/80, p. 102) Waste Isolation Pilot Plant—WIPP—is on again. The Department of Energy (DOE) has just announced it will proceed with full construction of the New Mexico project, a site for the disposal of high-level nuclear wastes generated by the Defense Department. Not only will experiments be run at WIPP to test storage strategies, but also geological monitoring of the site (SN: 1/2/82, p. 9) will continue to verify the safety of storing high-level radioactive wastes in salt beds.

WIPP will contain spacious accommodations — room for six million cubic feet of transuranic wastes. They'll sleep 2,150 feet below ground, near the center of a layer of salt 3,000 feet thick. Although the first wastes are not expected to check-in until the late 1980s, once they do they will spend at least the first five years in retrievable storage until plans are made for their permanent disposal, DOE says. And before the facility is ever decommissioned, the agency says, all high-level wastes will be removed.

## Synfuels Corp. makes its first award

On June 30, three years to the day after the U.S. Synthetic Fuels Corp. was created (SN: 7/5/80, p. 5), the corporation asked the U.S. Treasury Dept. to debit its account by \$120 million. The event marked the first legally binding award of financial assistance by the energy bank to a synfuel project. The award was made to the Cool Water coal gasification project in Daggett, Calif. As a price guarantee, the Cool Water award will not result in any actual transfer of money unless the price of the synthetic-natural gas that the plant should begin producing next year falls below an agreed level.

## LSD research: Flashback or reality?

The hallucinogen LSD, like its 1960s guru, Timothy Leary, seems to be making something of a comeback after about a decade of forced hibernation. The drug's resurrection is evidenced by scattered reports of increased usage and a renewed interest among research psychiatrists and psychologists. For example, at the American Psychiatric Association meeting in May, an entire symposium was devoted to "The forgotten use of LSD in psychiatry." At the symposium, several psychiatrists called for a loosening of societal and professional restrictions on research into the effects of LSD, in general and as a therapeutic tool.

Perhaps reflecting this rekindled interest are two reports in the August ARCHIVES OF GENERAL PSYCHIATRY. In one study, researchers examined the long-observed apparent similarity between LSD-induced psychotic episodes and non-drug-related schizophrenia, a severe psychosis characterized by a break with reality. Psychologists Michael M. Vardy and Stanley R. Kay of the Department of Psychiatry at Albert Einstein College of Medicine and the Department of Psychology at the Bronx Psychiatric Center, both in the Bronx, N.Y., analyzed the symptoms and histories of 52 "LSD psychotics" and 29 matched "first break schizophrenics" (those suffering their first psychotic episodes).

The researchers found that in terms of symptoms, course of illness, and apparent genetic predisposition, "the LSD psychotics were... similar to schizophrenics." The major difference was that the rate of alcoholism among parents of the LSD group far exceeded that of the parents of the schizophrenics.

The findings suggest that LSD does not trigger its own, unique form of emotional illness, the researchers say. But rather, among those who do experience such adverse reactions, the drug causes a standard psychosis "in persons vulnerable to both substance abuse and psychosis," they report.

In the second study, psychiatrist Henry David Abraham of the Harvard Medical School in Boston looked for incidence of flashbacks among 123 persons with a history of LSD use. Compared with 40 matched controls who had never used any strong hallucinogens, the LSD users exhibited a "syndrome... that included 10 distinct visual disturbances," Abraham says. The syndrome, which had lasted for five years in half of the LSD users studied, is precipitated by 19 different stimuli, he reports, the primary one being "emergence into a dark environment."

The hallucinations, in order of their prevalence, included:

- Geometric "pseudohallucinations" — people saw geometric figures before their eyes but did not believe the figures were real.
- Perceptions in the peripheral field.
- Flashes of color — often described as a sheet of light or mist.
- Intensified colors — object takes on a sudden vividness.
- Trailing phenomena — positive afterimages that remain immediately behind an object as it moves across the visual field.
- Imagistic pseudohallucinations — these included "the face of God" and "a Mickey Mouse cartoon."
- Halos around objects.
- Macropsia — perception of an object as larger than it really is.
- Micropsia — perception of an object as smaller; one subject said, "My feet looked like they were a million miles away."

Aside from darkness, other precipitants of such visual disturbances were intention (bought on willingly), marijuana, phenothiazines (antipsychotic drugs), anxiety and fatigue.

Abraham found that the hallucinations could be at least partially alleviated by benzodiazepines (anti-anxiety drugs), but exacerbated by phenothiazines. Also, noting that different users seem to have different susceptibilities to flashbacks, Abraham suggests that "there may be a genetic basis to LSD sensitivity."

In his new book, "Changing My Mind, Among Others" (Prentice Hall, 1982), Leary proposes that individuals be trained and licensed before taking LSD. It is not known whether this view is shared by Leary's partner on the current talk show circuit, G. Gordon Liddy.