

SCIENCE UPDATE

A murk measure for H₂O



When you turn on your faucet, you expect cool, clear water. But bacteria present in drinking water can occasionally turn it rust-colored, foul-smelling or milky. John O'Connor, chair of the civil engineering department, has developed a new water test hundreds of times more sensitive than currently used water-quality checks to track down those culprits. The new method, called the Acridine Orange Direct Count, reveals virtually all the water-borne bacteria that degrade drinking water quality.

"Most waterworks check for harmful coliform bacteria," says O'Connor. "They simply don't realize there are thousands of other bacteria present. These other bacteria aren't harmful to humans, but some remove or destroy the chlorine that is added to water at the treatment plant. With the chlorine depleted, bacteria that produce foul-smelling hydrogen, or dissolve iron and produce leaky pipes and rust-colored water, can thrive."

O'Connor's test gives faster, more accurate results than any previous method, enabling water treatment specialists to evaluate quality, not just safety.

No "safe dose" of Agent Orange . . .

Results of an animal study involving Agent Orange, a dioxin-containing defoliant widely used during the Vietnam War, have shown that even the so-called "safe," low-level dosages may produce subtle, but harmful neurological changes.

Vincent St. Omer, associate professor of veterinary pharmacology, exposed pregnant rats to low levels of Agent Orange. Although apparently healthy, the 700 tiny

offspring showed several deficiencies when compared to newborn rats from a control group.

"There was a retardation in the developmental process," St. Omer says, noting that the babies lagged behind in motor coordination and odor discrimination. "We need more research before we accept today's 'safe' levels at face value."

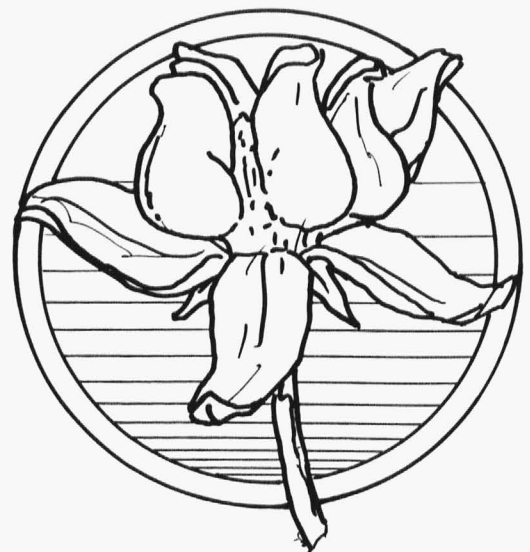
Early developmental retardation should be a cause for concern, concludes St. Omer, particularly if low-level exposure to the toxicant produces similar results in other species.

Endangered species survives

Loss of the nation's heritage of plant and animal species became a public concern with the passage of the federal Endangered Species Act, making allies of conservationists and research scientists. Steve Chaplin, assistant professor of biological sciences, addresses the pure research side of the endangered species concern in his investigation of the rare Mead's milkweed (*Asclepias meadii*), a small slender-leaved cousin of the familiar giant roadside milkweed, *Asclepias syriaca*.

Once widespread across U.S. prairie states, this inconspicuous white-flowered milkweed now is documented only from about 150 individual plants in Illinois, Kansas and Missouri, and has been proposed for the federal endangered species list.

Chaplin became interested in Mead's milkweed after learning that the Missouri Department of Conservation had discovered a number of the rare plants on one small stand of prairie in Pettis County. After several field seasons of work, Cha-



plin has located more than 300 plants in this 20-acre plot.

"Plants that are 'rare' face two critical periods," explains Chaplin, "pollination and seed maturation. If queen bumblebees don't successfully pollinate this milkweed, or if young plants are destroyed through grazing or haying, the whole reproductive process is over."

Milkweeds package their pollen in tiny sacks, called pollinia, which are carried to other milkweed flowers on bumblebees' legs. A stand of very few plants may not attract enough nectar-seeking bees for effective pollination. Or if pollinator numbers are reduced, through destruction of bumblebee nests, for instance, the plants are stranded, unable to self-pollinate.

Using ecological fields techniques as well as laboratory studies, Chaplin found the pollination success of Mead's milkweed to be fairly low. He thinks the plant's survival in Missouri, despite its pollination problems, may be due to the state's haying practices.

"In Iowa and Wisconsin, the species has disappeared," says Chaplin, "since farmers take several hayings from the same field during a growing season." If very young plants get cut down year after year, their populations eventually die out. In southwest Missouri, however, where most of the state's Mead's milkweed is found, many farmers mow only once, rather late in the season.

This extra growing time, although not enough to allow the plants to produce mature seed pods, does enable them to store enough nutrients and energy to sprout again the following spring and give things another try, thus remaining rare but staving off extinction.

Charismatic Catholics

New movements in age-old faiths are on the rise in the United States, and Mary Jo Neitz, assistant professor of sociology, has completed a three-year study of one of these offbeat religious groups.

Charismatic Catholics, a born-again, faith-healing group, have what Neitz calls an "I'm okay, you're okay" philosophy with a theological twist. Current social problems are attributed to "the work of the devil" and thus of little concern to the charismatic Catholic. Traditional Catholic attitudes of guilt regarding social prob-

lems are thereby eliminated.

Seventy-five percent of the charismatic Catholics are women, but the sect is male-dominated, with a husband, father or priest making all decisions. Neitz's study also found that God is commonly referred to as "daddy" and entrance to heaven is guaranteed once the holy spirit is accepted.

Beefing up cow's milk



Milk is not quite the perfect food—at least not perfect for young and middle-aged women, whose iron requirements exceed those of men. Milk contains little iron naturally, but Robert Marshall, professor of food science and nutrition, has developed a way to "beef up" milk without the off-taste which results when iron is simply added.

"Even small amounts of iron cause the milk to undergo chemical changes making it taste like wet cardboard," Marshall says.

Marshall discovered that if he added a commercial iron supplement, Bio-plex Fe, during a pasteurization process that used a higher temperature for a longer time, the milk's taste was unaffected. Taste panels deemed the iron-supplemented milk fine, and the iron seemed to reduce the "cooked" flavor sometimes associated with higher pasteurization temperatures.

"Our result was a good-tasting product with 20 percent of the minimum daily requirement of iron per 8-ounce serving," Marshall says.

Women need a good source of iron that is easily assimilated, he points out. Seven quarter-pound hamburgers a day would do it, but calories would be prohibitively high. Most vegetables are lower in iron than meats and their iron is not as easily assimilated.

"Milk is a natural vehicle for adding iron to women's diets," Marshall says, "because it is a large part of the diet of many women."