

of the National Institute of Mental Health (NIMH) in Bethesda, Md.

When prohibited from using artificial light from dusk until dawn, people who formerly slumbered in solid blocks of time begin to sleep in two periods separated by an hour or two of quiet rest and reflection.

Wehr and his coworkers asked 15 healthy adults to rest and sleep in darkness for 14 hours (6 p.m. to 8 a.m.) each night for several weeks. Volunteers slept for 11 hours each of the first few nights, apparently to catch up on their sleep. They then settled into a pattern of lying awake for a couple of hours before falling asleep for 3 to 5 hours in the evening. An hour or so of quiet wakefulness ensued, followed by about 4 more hours of sleep in the early morning.

Many mammals sleep in two major bouts during the night or day, Wehr says. Animals from rodents to giraffes and the experimental human sleepers secrete elevated amounts of the hormone prolactin when they rest quietly, even if they are not asleep. Prolactin may promote a state of calmness that accompanies sleep, the NIMH scientist suggests.

Participants in Wehr's study usually awoke out of REM sleep to end their first slumber session. During REM sleep, the

brain becomes about as active as it is when wide awake. One function of this sleep phase may be to set the stage for waking up, Wehr holds.

If prehistoric people slept in two nightly periods, then regularly awakening out of REM sleep may have allowed them to reflect on and remember their dreams in a semiconscious state that's generally unavailable to modern sleepers. Sleep compressed into a single stint may thus encourage modern humans to lose touch with dreams, myths, and fantasies, Wehr argues.

These results, first reported in 1993, also raise the possibility that people who wake up once or twice each night don't necessarily suffer from insomnia. "A natural human sleep pattern may reassert itself in an unwelcome world and get labeled as a disorder," Wehr says.

The two-phase sleep pattern observed by Wehr corresponds remarkably closely to the way in which most Western Europeans slept between 500 and 200 years ago, according to historian A. Roger Ekirch of Virginia Polytechnic Institute and State University in Blacksburg. While doing research for a book on nighttime behaviors during that era, Ekirch came across several hundred references to what he identifies as "segmented sleep."

From country farms and villages to city apartments, early modern Europeans usually sank each evening into what they called a "first sleep," which lasted for several hours. Shortly after midnight, they awoke and spent 1 or 2 hours in a "watching period." A "second," or "morning," sleep followed.

The watching period presented many opportunities, Ekirch notes. People coming out of their first sleep often stayed in bed to pray, converse with a bedfellow, contemplate the day's events or the meaning of a dream, or simply let their minds wander in a semiconscious state of contentment that was prized at the time.

A 16th-century physician wrote that many laborers dozed off exhausted at the start of each night. Sexual intercourse with their wives typically occurred in the watching period, after a recuperative first sleep.

These days, Western societies treat sleep more as an unavoidable stretch of downtime than as a prelude to sex or a time for inner reflection. Only intensive investigations across cultures and classes will illuminate the lushness of sleep's landscape, Worthman predicts.

Adds Wehr, "We're going to have to reconceptualize what it means to sleep normally." □

Environment

Plastic mulch's dirty secrets

In many areas of the country and for many crops, mulching fields with sheets of plastic has become de rigueur. Not only do these impermeable blankets help retain moisture, but they also warm the soil. As a result, mulched crops tend to ripen sooner (SN: 12/13/97, p. 376), a boon to many farmers.

These benefits, however, come at some expense to the environment, a new Agriculture Department study finds. The practice increases both erosion and runoff of toxic pesticides.

Many farmers had noticed that more rain flows from plastic-mulched fields, via dirt furrows between the covered rows, than from fields covered with plant-stubble mulch. However, "nobody had bothered to ask how much more [water runs off]," notes Cathleen J. Hapeman, an inorganic chemist at the Beltsville (Md.) Agricultural Research Center (BARC). So, during 2 years, she and her colleagues collected all the rainwater flowing from tomato fields and measured the amount, as well as any contaminants in it.

In 1998, the year with the more dramatic results, they found that an average of 63 liters of water ran off each square meter of the plastic-mulched soil. That's four times the runoff from a field mulched with material from a plant known as hairy vetch. Even "more disturbing," Hapeman reported at the American Chemical Society meeting last month in New Orleans, is that the plastic-covered field lost 4,950 kilograms of dirt per hectare that year—almost 15 times as much as the vetch-mulched field. Clearly, she observes, with such a slowly renewing resource as soil, "you cannot sustain such losses for very long."

Then, she looked at chemical runoff. Each of the two test fields had been sprayed with the same amount of the fungicide chlorothalonil and the insecticide endosulfan. Because the plastic-mulched field has less exposed soil that can bind the pesticides, rain washed away 19 times as much of the chemicals from it as from vetch-covered rows. The researchers then added this runoff to containers holding local aquatic inhabitants, including hard

clams and diatoms. The plastic mulch's runoff was usually much more toxic than the vetch's, says Hapeman.

Using plastic mulch enables farmers to harvest crops 3 or 4 weeks early. Such vegetables can command high market prices. "However, I'm having a hard time justifying that 3-week-earlier harvest in exchange for this loss of soil and pesticides," Hapeman says. —J.R.

Lousy news: Pesticide resistance

Head lice plague children the world over. These parasitic bugs, however, are not equally vulnerable to some modern delousing shampoos. U.S. lice are more likely to survive a dousing than are the parasites in Sabah, Malaysia, a new study finds. This suggests the Western bugs are becoming resistant to at least one of the most popular delousing pesticides.

Richard J. Pollack of the Harvard School of Public Health in Boston and his colleagues collected lice from the heads of 75 U.S. children, most of whom had been unsuccessfully treated, and another 58 kids in Malaysia. The researchers then housed the critters in dishes lined with permethrin-impregnated paper. Shampoos containing this relatively nontoxic pesticide have become popular delousing treatments in the United States but are not used in Sabah.

While virtually all Malaysian lice quickly succumbed to both small and large doses of the pesticide, almost none of the lice from the U.S. children did. Indeed, Pollack says, for the U.S. lice, "if a little permethrin wasn't effective, neither was a larger dose." The message for parents, he and his colleagues report in the Sept. 15 ARCHIVES OF PEDIATRIC AND ADOLESCENT MEDICINE, is to be ready to switch shampoos. If one doesn't rout the bugs, change to a treatment with a different active ingredient. Also, when possible, parents should religiously groom infested hair with louse-catching combs, the researchers say. —J.R.