

The 90-minute cycle

Spring fever, and your fancy lightly turns to thoughts of love. Or, to put it less romantically, your body begins to go through some yearly glandular changes. Menstruation in women and the mood changes experienced by some men operate on a monthly cycle. Body temperature, hormone production and blood-pressure levels operate on a daily or circadian rhythm. The cyclic pattern of biological life, however, does not stop with the obvious 24-hour cycle. Scientists are finding increasing evidence for a 90-minute cycle, named the ultradian rhythm (from the Latin *ultra*, meaning beyond).

Ultradian rhythms were first suspected more than 20 years ago when researchers discovered that rapid eye movement or REM sleep occurs in cycles of 90 to 100 minutes. REM sleep consists not only of eye movements but also of dreams and changes in muscle tone and brain-wave patterns. The reasons for this alternating rest-activity cycle during sleep are still unclear, but it has been suggested that the 90-minute rhythm may represent an internal drive cycle that continues throughout the waking hours. And this does seem to be the case, say Peretz Lavine and Daniel F. Kripke of the University of California in San Diego. In the April *PSYCHOLOGY TODAY* they report on experiments which indicate that stomach contractions and oral activity (often expressed in dreams) fall into the ultradian rhythm. In other experiments, the researchers found that swings of mood, flights of fancy, periods of mental alertness and the appetite for sex often follow a 90-minute cycle throughout the day. Interestingly, some of the subjects who had previously shown signs of possible psychiatric disturbance did not fall into the ultradian pattern but were on a very irregular schedule. "If this turns out to be a reliable finding," the researchers say, "we may be able to understand certain personality disorders as disturbances in drive cycles." But the timing of psychiatric examinations, the authors suggest, should probably take into account fantasy cycles. The existence of ultradian rhythms has other implications as well. If these subtle cycles can be accurately identified, people might learn to be more tolerant of the mood swings of others and might learn to use their internal rhythms to better schedule meals, naps, periods of concentration and work and sexual activity.

Rhythmic volunteering

The chances of a college woman volunteering for a behavior study may depend on the stage of her menstrual cycle, Richard L. Doty of the University of Pennsylvania and Colin Silverthorne of the University of San Francisco report in the March 13 *SCIENCE*. The psychologists conclude that "human behavioral science is largely the science of punctual college sophomore volunteers," who, if women, are probably ovulating when they agree to participate. In addition, volunteers tend to have more education, higher occupational status, higher need for approval and lower authoritarianism than nonvolunteers.

Since some women feel tense, irritable and tired just before menstruating, but are more elated and active near ovulation, those who are ovulating may be more likely to respond to peer-group pressure and to volunteer. If the pattern is typical, random population sampling may not be cross sectional at all, but instead, may represent punctual college women who are probably not menstruating and are at or near ovulation.

Less sunshine in the United States

After 23 years of studying the amount of sunshine that falls on 103 recording stations scattered throughout the United States, two scientists with the National Oceanic and Atmospheric Administration (NOAA) have reached a mildly disturbing conclusion: The percentage of possible sunshine that actually reached the earth's surface during autumn decreased some eight percent between 1950 and 1972 in the 48 contiguous states, though a three percent increase in the springtime partially compensated. At first, average yearly sunshine varied little, but after 1964, it decreased 1.3 percent within 6 years.

The sharp drop of sunshine during autumn represents an "interesting climatological phenomenon with impact on a local and perhaps hemispheric scale," says James K. Angell, one of the scientists conducting the study, and the implied decrease in cloudiness during spring "could be of some importance from an agricultural point of view."

But meteorologists are not sure what has caused the annual decrease of sunshine, which is equivalent to the loss of about 10 minutes of sun a day. Three hypotheses have been put forward: Cloudiness may be increasing as a result of other climate changes; aircraft contrails may be enhancing cloudiness, or pollution may have increased enough to affect sunshine sensors.

Retrieving wasted gas

Despite high prices and increasing scarcity of natural gas, an abundant source of alternative fuel is going to waste, says Pennsylvania State University professor David Long. Long had some students survey sewer authorities in Pennsylvania to see what use was being made of the digester gas, or "off-gas," created during the bacterial treatment of human waste. Their conclusion: Less than ten percent of the installations were putting it to any use.

Such waste may amount to an annual loss of nearly \$50 million, Long says, since the gas could be used to generate electricity, provide industrial space heating and even domestic heating. Some problem does occur because of high moisture content and traces of hydrogen sulfide in the gas, but Long says these difficulties are easily overcome with inexpensive, existing technology. He points to the few communities that are using digester gas to generate electricity and says that a city the size of Philadelphia could produce gas worth \$3,000 a day.

Irrigation scheme may hurt wildlife

The Garrison Diversion Unit—an irrigation project aimed at diverting water from behind the Garrison Dam on the Missouri River to farms in North Dakota—"will destroy or seriously damage 50,000 to 80,000 acres of prairie wetlands and ruin seven major national wildlife refuges," according to an article in the March *AUDUBON* magazine. And though farmers at the receiving end of the 3,000-mile system of pipes and canals may benefit, those closer to the water source will suffer as existing wells and aquifers are drained. The net loss of cropland will be 8,148 acres, says writer Alvin M. Joseph Jr.

Already, hundreds of acres of marshes and sloughs have been dried up, he writes, which has caused the "decline or disappearance of once-abundant waterfowl." The work is being done by the Bureau of Reclamation, despite reported objections of the Environmental Protection Agency, the Council on Environmental Quality and Canada.