In what he calls "an interesting footnote" to Westerners' nearly 400 years of fascination with synchronous fireflies, Buck notes that until recently, no one recorded speculations about the biological meaning of the displays. During the past couple of decades, however, scientists have made up for lost centuries.

Case, the only scientist so far to describe a synchronous Asian species actually mating, reports that males keep on flashing as a female lands in their midst. The male who triumphs in attracting her favors swivels his abdomen around so that his lantern blasts on and off right in front of his partner's eyes during the entire coupling. "It's to keep her mind off the other males," Case speculates.

Clearly, the flashing has something to do with mating. Males may be sending a neon message as direct as "Over here, girls!" But why broadcast it at nearly the same millisecond as thousands of other equally available guys?

"It's not mystical," grumbles James Lloyd of the University of Florida in Gainesville. He protests against a tendency to elevate synchrony to the status of unexplainable phenomenon.

In Buck's 1988 review of the field—a 50-year update of his first scientific review of the literature—he mentions nine hypotheses to explain synchrony. One suggests that flashing in unison aids the females in picking out the rhythm of the right species. Another proposes that females essentially get temporarily numbed by a flash and can't perceive or respond to a subsequent flash unless they get a brief resting period, so there's no point in one individual's lighting up before the others. Another idea was that a male would flash in unison with a neighbor already flirting with a female. That way he might get a chance to steal her fancy.

Copeland says that he wouldn't be surprised if the synchrony in Elkmont guarantees a nice, dark moment for roving males to get their bearings on the faint answering wink of a female, without the interference of some other hotshots showing off their flashers. "The male is enormously bright—it's just dazzling," he reports. He and Andrew Moiseff of the University of Connecticut in Storrs are just starting to work on the synchronicity of the coastal flashers.

Detecting males synchronizing for any reason can be tricky, he cautions. Insects can fall into phase just by chance, flashing together for cycle after cycle. Even traffic cones with flashing caution lights can seem to fall in step for six to eight cycles and then drift out of synch again. Copeland has demonstrated this illusion of synchronicity by visiting a road repair site at 3 a.m. and filming the traffic cones for a while.

"If you have to stretch and strain to see it, it's not there," he advises synchronicity hunters. Just by chance, fireflies often blink together for five, six, or more cycles before falling out of phase. However, fireflies that stay in synch for 3 or 4 minutes, and hundreds of flashes, merit serious attention.

He remembers his own experience seeing the Tennessee flashers for the first time. Thrilled with the discovery, he phoned Moiseff to tell him the males were synchronizing. "I said, 'Andy, it's absolutely obvious,' and he said, 'Prove it.'"

Copeland then spent the summer videotaping fireflies, recording flash activity of individuals in cages, and working through the data a few milliseconds at a time. With just a touch of crankiness, Copeland recalls that the next year, "when Andy finally came down and saw it, after about 30 seconds, he said, 'It's obvious.'" □

Behavior

Learning to make, keep adult neurons

Certain types of learning, and even regular exercise, appear to enhance the formation and survival of new brain cells in adult rodents, two teams of neuroscientists find.

Their investigations, both published in the March NATURE NEUROSCIENCE, focused on cell births in the mature hippocampus. A growing body of research indicates that this small neural structure, which contributes to learning and memory, produces fresh nerve cells throughout the lives of humans, monkeys, and other animals (SN: 10/31/98, p. 276).

A group led by Elizabeth Gould of Princeton University injected a group of rats with a chemical that labels newborn cells. A week later, some of these rats received training in one of four tasks.

The number of newly generated cells doubled in rats after training on one of the tasks that are known to require an intact hippocampus, the scientists report. One consisted of learning to expect delivery of an electric shock to the eyelids (as evidenced by eye blinks) just after hearing a distinctive blast of noise; the other required animals to find and remember the location of a submerged platform in a water-filled maze.

Two tasks that did not depend on the hippocampus—learning to associate noise blasts with concurrent electric shocks and to swim to a visible platform placed at random locations in a water maze—failed to generate increases in labeled neurons. Untrained mice also produced no extra neurons.

Hippocampus-dependent learning aids the survival of cells created before training, rather than sparking more cell production during training, Gould's team proposes. Labeled cells did not surge in number in rats that were injected immediately after starting any of the training sessions.

A second study, directed by Henriette van Praag of the Salk Institute for Biological Studies in La Jolla, Calif., finds marked increases in the surviving number of new hippocampal cells in adult mice that were put in cages with running wheels immediately after receiving injections of the chemical label for neural newcomers. Enriched housing, which featured opportunities for frequent social interaction and varied types of play, also yielded substantially greater numbers of surviving newborn cells.

Unlike the adult brain's outer layer, or cortex, the hippocampus may cultivate fresh neurons to deal with novel information as it discards others that have become obsolete, theorize William T. Greenough of the University of Illinois at Urbana-Champaign and his colleagues. —*B.B.*

Schizophrenia's places and seasons

Environmental factors may outweigh genes as contributors to population rates of schizophrenia, a Danish study finds.

Epidemiologists led by Preben Bo Mortensen of Aarhus University Hospital in Risskov, Denmark, used government data sources to identify 2,669 cases of schizophrenia among all 1.75 million people whose mothers were Danish women born between 1935 and 1978. Schizophrenia's fragmentation of thought and emotion usually emerges in young adulthood.

The likelihood of developing schizophrenia was sharply higher among people with a mother, father, or sibling who had schizophrenia, compared with people who had no schizophrenia in their families, the researchers report in the Feb. 25 NEW ENGLAND JOURNAL OF MEDICINE. Mortensen and his coworkers also found that urban birth exerted a powerful impact on the schizophrenia rate. After that came birth in February and March, followed by a family history of schizophrenia.

These findings may reflect the influence of prenatal brain disruptions in response to factors such as exposure to infections and poor maternal nutrition, in causing schizophrenia (SN: 2/3/96, p. 68), says psychiatrist Nancy C. Andreasen of the University of Iowa in Iowa City. —*B.B.*