# BEHAVIOR

## Mathematical values

Women make up only 5 percent of the Ph.D. recipients in mathematics — a case of inequity that has been blamed on everything from institutional sexism to genetic differences. Now a new report suggests that it may be women's sense of values — specifically a strong sense of community — that prohibits success in higher mathematics. According to Northwestern University sociologist David Maines, his study of 168 mathematics majors (half male, half female) at three Illinois universities revealed significant sex differences in the socialization of mathematicians. Where males are very single-minded in their pursuit of mathematics, Maines says, females are much more sensitive to social obligations and pressures. This sense of social responsibility effectively bars many women from the study of higher mathematics, which requires extreme intellectual isolation, Maine says. Males, in contrast, are permitted the kind of individualism that math demands. "It's like two cultures," he concludes. "I think that women in our society are brought up to act in other people's interests." Maines found that while women did well academically, they were not consumed by mathematics as the men were; the women studied far less than males and rarely made mathematics part of their leisure time activity, as males did. He also found that females, more often than males, were both discouraged from and encouraged to pursue mathematics as a career. "If a male wants to go into math, it's not an issue," Maines says. "With a female, it is. Even positive encouragement points to a cultural bias."

Maines says that his findings contradict those of Johns Hopkins University psychologists Julian Stanley and Camilla Benbow, who a few years ago reported that socialization is not a significant cause of sex differences in mathematics. In response, Stanley argues that Maines' study only shows what has been known since the 1930s — that women and men have different value patterns. But no causal inferences can be made, he insists. He says that since the publication of the original SCIENCE article, he has collected data on an additional 24,000 12-year-olds showing significant male superiority in math ability. He emphasizes that his findings only rule out the effects of differential course taking and do not argue for a genetic basis for math ability.

## Sinister headaches

Left-handed people are more likely to suffer from a variety of disorders, including migraine headaches, autism, and autoimmune diseases, according to a new study by neurologists Norman Geschwind of Beth Israel Hospital in Boston and Peter O. Behan of Glasgow University in Scotland. The researchers studied left-handers and found that left-handers and their relatives have a higher incidence of these disorders than right-handed controls; in addition, a study of neurological patients found that left-handed people were overrepresented in the clinic population. Geschwind and Behan, whose findings are reported in the August PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, speculate that the male hormone testosterone may be to blame. Testosterone, they suggest, inhibits the growth of the brain's left hemisphere, permitting more growth of the right hemisphere and the consequent development of left-handedness — more common among males than females. Testosterone is also suspected of interfering with neuronal migration during the development of the fetus, so that an excess of testosterone (enough to cause left-handedness) might also affect brain cell structure (causing language disorders like autism) and the development of the immune system. The connection with migraines is unclear; migraines themselves are a mystery, but it is possible that they are caused by abnormal reactivity of the blood vessels, which may have a neuronal origin.

# BIOLOGY

## More fuel against fire ants

The fight against fire ants has spawned a new type of pesticide — one which disrupts the caste structure of the ant colony. The chemical, originally synthesized by Meyer Schwartz of the Department of Agriculture, is an insect hormone modified to be more stable in the environment. Worker ants carry the compound, known as MV-678, back to their colony where the larvae react as if they were exposed to natural juvenile hormone for a prolonged period, says Ray Maltby of Stauffer Chemical Co. The larvae develop into idle, imperfect sexual ants rather than into asexual workers. The resultant worker shortage leads to insufficient food gathering, brood tending and colony maintenance, and to the death of the colony two months later.

Stauffer expects to obtain approval from the Environmental Protection Agency and market the pesticide under the name Pro-Drone next year. The appeal of the chemical is that by employing a natural element of the pest to disrupt development, the pesticide's harmful effect is directed specifically against fire ants. The low toxicity to other organisms and MV-678's rate of breakdown in the field (it persists only a few days) make MV-678 appear safe for the environment. Because the pesticide acts slowly, Stouffer expects its initial market not to be homeowners, but those who do large-scale pesticide applications.

Currently there is only one compound approved for use against fire ants, and it is restricted to non-agricultural lands, pastures and rangeland, and use around lakes and streams is discouraged. The pesticide, called Amdro, is produced by American Cyanamid (SN: 8/30/80, p. 133). Amdro is a poison that fire ants carry back to their mound where it kills the queen and other inhabitants. Charles Adams of American Cyanamid reports that Amdro is being used successfully, especially by homeowners. American Cyanamid has requested approval for Amdro use in crop areas, and the EPA expects to reach a decision next month.

A more exotic approach to the fire ant problem centers on beetles that move into ants' nests and eat the larvae and pupae, as well as the regurgitated food provided by worker ants. These beetles camouflage themselves by acquiring hydrocarbons in their cuticles to mimic the odor of the host colony and change hydrocarbons when they move into a different colony, report Robert K. Vander Meer and Daniel P. Wojcik of USDA. Beetles in high numbers might eat enough ant larvae and pupae to become useful in pest control.

## Lockheed flying high with pigeons

How does the Lockheed Missile and Space Company transport design drawings to its test base? It uses a time-honored method: the carrier pigeon. Since January pigeons have been carrying microfilm four days a week from Lockheed's facility in Sunnyvale, Calif., over the mountains to the Felton base 30 miles away. With favorable winds, a pigeon makes the flight in 30 minutes. The trip by car over winding mountain roads takes an hour and a half. A spokesman for Lockheed explains that designers and engineers at the test base send their work by microwave to the computer at Sunnyvale at the end of each work day. The computer makes a drawing of the work, which the Felton workers need to have the next morning. Using a carrier pigeon to transport microfilm prints of the drawings is far less expensive than using a computer-linked machine to transmit the designs at $10 per print for 30 to 50 prints per day. (Lockheed has acquired such a machine as a back-up.) One pigeon can carry the microfilm for all the design prints, and the pigeon is then returned to Sunnyvale in the daily mail van. Werner Deeg, a research chemist, trained the pigeons. The Lockheed flock now numbers 15, and is maintained at a cost of about $100 a year.