Behavior

Sex: Doing what comes naturally?

One thing David Rubin forgot to mention in *Everything You Always Wanted to Know About Sex* is whether sexual behavior is inborn or acquired. There is now reason to believe that copulative behavior may not be solely endogenous, at least if rat experiments are any indication of human experience.

Alan Silberberg, a psychologist at American University, and Norman Adler, a psychologist at the University of Pennsylvania, set up an experiment to see whether rats could learn to control their sexual behavior. One group of rats had the opportunity to ejaculate only if it occurred within the first of seven intromissions before ejaculation. Another group of male rats, the same age, could intromit until ejaculation. Still another control group was used to evaluate noncontingent effects, such as frustration, that might induce a change in ejaculatory habit.

As the psychologists report in the July 26 SCIENCE, the experiment showed that the first group of rats learned to change their ejaculatory responses to get them in within the first seven intromissions. The two control groups showed that the change was indeed a learning experience, not due to maturation in sexual experience or to frustration.

When Einstein was a failure

When parents complain that their apparently intelligent child is late in talking or is doing badly in school, Ronald Illingworth of the University of Sheffield (England) Department of Child Health tells them about famous scientists who started as underachievers.

Albert Einstein caused his parents anxiety because he was late learning to talk. Claude Bernard did badly in school because he thought that all reading was a waste of time. Gregor Mendel twice failed an examination to give him a teaching certificate. Thomas Edison was emotionally disturbed because he was always at the bottom of his class. Charles Darwin was told by his father: "You care for nothing but shooting, dogs and rat catching. You will be a disgrace to yourself and your family."

"When children are underachievers, refuse to wash, look dreadful or behave abominably," Illingworth declares in the May-June WORLD MEDICAL JOURNAL, "it is a good thing to know that one can never tell what they will achieve in the long run; they may be the world-famous men and women of tomorrow."

(S)wallowing in puddles

Dignified swallowtail butterflies can often be seen feeding at the edges of puddles or mud, or even off of carrion or animal feces. What prompts these insects to engage in such inelegant "puddling" behavior? Are they seeking a nutrient they don't get from plants? Karen Arms, Paul Feeny and Robert C. Lederhouse of Cornell University report in the July 26 SCIENCE that the butterflies are probably seeking sodium ions.

The entomologists observed swallowtail butterflies puddling on mud southeast of Ithaca. They set out plastic trays that contained sand and water. Some of the trays also contained salt-free nutrients, sugar or salt. Although the butterflies made frequent visits to all the trays, they definitely preferred to feed from the trays containing the salt. The researchers conclude that the butterflies were seeking salt because there is very little of it in many plants. Sugars and probably also amino acids are available from nectar.

Chemistry

Mercury conversion in natural waters

The pathway inorganic mercury follows between its release as a pollutant and its concentration in fish is not well understood. But chemists have been closing in on the problem since they first detected high levels of the organic form, methylmercury, in fish (SN: 4/18/70, p. 388). A slightly comforting belief about the pathway has now gone by the wayside with some recent research, and the emerging picture is dismal.

It had been thought that inorganic mercury, mainly from the effluents of chlorine and caustic soda factories, was converted to the organic form only in the sediment of lakes and streams by certain nonoxygen-using water bacteria. This represented a somewhat limited system for interconversion, since most waters are well aerated.

Now, Carl J. Popp, Rollie Schafer, Don H. Baker III and Donald K. Brandvold of the New Mexico Institute of Mining and Technology at Socorro reveal a different picture. They reported at an American Chemical Society regional meeting in Albuquerque that bacteria and fungi in natural, aerated water can rapidly convert inorganic mercury to methylmercury. This makes it continuously available for uptake by all higher organisms in the environment—fish, birds and animals.

All previous experiments on mercury uptake by fish used water with high mercury concentrations, Popp says, but theirs is the first to simulate natural, low-level conditions.

On the trail of the magic mushroom

The common, cultivated mushroom, *Agaricus bisporus*, may have another use besides pleasing palates. A team of pathologists at Duke University report in the July AMERICAN JOURNAL OF PATHOLOGY that the mushrooms' spores are a promising source of antibiotics.

F. Stephen Vogel, Sharon J. McGarry, Lieselotte A. K. Kemper and Doyle G. Graham studied specific chemicals, called quinoids, which they believe are responsible for the Rip Van Winkle properties of mushroom spores. These quinoid compounds appear to induce a dormant state in the spores that allows them to survive adverse environmental conditons, then "wake up" and germinate when conditions are appropriate for growing mushrooms.

They found that a pink oxidation product of the inhibitor called gamma-L-glutamyl-3,4,benzoquinone is a powerful antibiotic, which inhibits the growth of many common human pathogens. The club fungi family (of which *Agaricus bisporus* is a member) is large, they state, and therefore a promising frontier for antibiotic research.

Sex and the elm bark beetle

Until now, the most effective method for controlling the widespread Dutch elm disease has been a drastic one—amputate the patient at the roots. But U.S. Forest Service scientists at the State University of New York may soon have a better system. The disease, a fungus infection, is spread during the mating and egg-laying activities of bark beetles. Female beetles release a sex attractant (a pheromone) which lures males carrying fungus particles on their bodies. The team, headed by Robert M. Silverstein, has now isolated and identified the chemical structures of three pheromones released. The next step is to synthesize the attractants in the laboratory, so males can be attracted to waiting traps, not elm trees.