

Environment and the nervous system

Exposure to sensory input during postnatal development can influence the nature of the vertebrate nervous system. If sensory input could be shown to influence the development of the simpler nervous system of an invertebrate, then investigators might be able to determine, at the level of identified neurons, the mechanisms by which the environment modifies the nervous system.

An environmental influence on invertebrate neurons has now been shown by R.K. Murphey and S.G. Matsumoto of the State University of New York at Albany. Cricket neurons exposed to continuous stimulation during postembryonic development responded to new stimuli much slower than did neurons that were not stimulated constantly, they report in the Feb. 13 SCIENCE.

They reared crickets from hatching to adults in the presence of continually produced tone pulses. They then recorded the electrical activity of neurons from these crickets upon presentation of a new stimulus and compared it to the electrical activity of cricket neurons that were presented with the same stimulus, yet had not been previously bombarded with tone pulses. They found that the former habituated themselves much more slowly to the new stimulus than the latter did.

They conclude that the constant stimulation of newborn crickets' neurons made their neurons much less responsive to new sensory inputs. Whether the same situation applies to the neurons of newborn children remains to be seen.

Quick diagnosis of pregnancy

In 1974 Brij B. Saxena of Cornell University Medical College announced the development of a test that can detect pregnancy as early as six to eight days after conception. It is a radioreceptor assay that measures the levels of a specific hormone—human chorionic gonadotropin—that appears early in pregnancy. Furthermore, the test can define the quality of pregnancy, signaling imminent spontaneous abortion, ectopic pregnancy or other abnormalities.

The test has now been confirmed as highly effective by investigators at Harvard, the University of Southern California, Downstate Medical Center and the University of Louisville. Cornell has also licensed Princeton Laboratories to manufacture a pregnancy kit based on the radioreceptor assay. The kit should become available to clinical laboratories and hospital clinics this spring. Eventually it should become available to physicians as well and perhaps even to women themselves.

Diagnosing meningitis

A particular test known as the *Limulus* lysate assay has been reported by several investigators as valuable for rapidly and accurately diagnosing meningitis caused by the endotoxin of particular gram-negative bacteria. The assay identifies the presence and amount of endotoxin in the cerebrospinal fluid of a possible victim. This assay is unfortunately not quite as sensitive as thought, two University of Texas Health Science Center physicians, George H. McCracken and Larrie D. Sarff, report in the Feb. 9 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

They used the test to measure endotoxin in cerebrospinal fluid specimens taken from 84 children afflicted with meningitis caused by gram-negative bacteria. Endotoxin was detected in only 71 percent of cerebrospinal fluid samples obtained on initial tapping of the infants' spines. But if the assay was combined with another test, 81 percent of the infants were correctly diagnosed. So the investigators conclude that the assay should be used, but only in conjunction with other tests.

Sex and the single seal

Many naturalists have contended that competition among males of a species is the determining factor in sexual selection and that female choice is not as important. Now a study of mating habits among elephant seals off the Pacific Coast indicates that females do play a more active role than once supposed, apparently inciting competition among males and mating with the most dominant. The study was conducted by Burney J. LeBoeuf, a member of both the psychology and biology departments at the University of California at Santa Cruz and Cathleen R. Cox, a psychology graduate student at Stanford. Their report will be published soon in AMERICAN NATURALIST.

Cox and LeBoeuf found that most of the time, particularly during the early part of the mating season, a female seal will protest loudly when approached by a bull. These cries draw other bulls, and a fight ensues. Eventually harems form, with a virile male able to control and mate with up to 40 females. Toward the end of the season, females become more receptive. As they return to the sea, they will often mate with one of the peripheral bulls—an act that helps to ensure pregnancy.

The Cox-LeBoeuf study is among the first to examine such female behavior to see if it influences mating patterns—though Darwin suggested an active female role more than a century ago. Besides adding insight to animal behavior, the study may help preserve the elephant seal through better understanding its habits. In the 1880's, only 100 individuals were left; now herds are estimated at 40,000.

Interpreting bear behavior

A three-year study sponsored by the National Science Foundation is destroying some old myths about bear behavior and may help make national parks safer for both people and bears. Allen W. Stokes, a professor of animal behavior at Utah State University, has been studying brown bears in Alaska's McNeil River State Game Sanctuary for more than five years. He concludes that the old beliefs about the animals' unpredictability, aggressiveness and antisocial behavior are largely incorrect.

Each year, when salmon mount the McNeil River to spawn, as many as 70 bears will gather at a favorable spot for a month to enjoy the passing feast. As long as the food stays plentiful, the bears remain at peace, threatening neither each other nor the human observers. Stokes and his helpers shot thousands of feet of movie film, now undergoing computer analysis, but already the clear impression has been gained that bears can communicate—at least to a degree—through body language. A characteristic threatening crouch, for example, serves as fair warning to other bears, and should do the same to humans. Other signals indicate intent to attack, and still others, a willingness to play.

Measuring the quality of life

The National Wildlife Federation publishes an annual report in which it estimates the environmental quality of life in seven resource areas. This year's report appears in the February/March NATIONAL WILDLIFE magazine.

All categories measured show deterioration, except two. Air quality, NWF judges, is up, with sulfur dioxide pollution cut by 25 percent and carbon monoxide by 50 percent, since passage of the Clean Air Act. Timber is unchanged, with more trees being cut than planted, but reforestation projects growing. Soil quality is down (2.2 million acres of farmland were lost last year to other uses) and so is wildlife (six new animals on the endangered list). Other deteriorating areas: water quality, minerals and living space.