behavioral sciences notes

Gathered at the meeting of the New York Academy of Sciences last week.

PHARMACOLOGY

Emotions Reliant on Memories

Advent of the mood-changing drugs such as tranquilizers and antidepressants has made even more crucial an old, ever-present problem in drug studies—extrapolating results from animals to humans.

It was bad enough when pharmacologists were evaluating, say, a heart drug for human use by studying dogs. Now with drugs that affect emotions, laboratories are on even shakier ground with their animal studies.

The transiency of emotional effect from one of the mood-changing drugs, depends very much on what an animal can store in its memory, says Dr. Ethel Tobach, assistant curator at the American Museum of Natural History and Chairman of the Conference, "Experimental Approaches to the Study of Emotional Behavior."

A rat, for instance, fights an intruder because of its smell. But a monkey fights a stranger from a much broader range of cues, based on past experience. The important cues for human aggression are far more complex than these, says Dr. Tobach.

She pointed out that no statement about aggression can be generalized from one species to another except the broadest comment that an animal will react according to its history, including its species characteristics and its own individual experiences.

The new drugs can only be evaluated by discovering their neurological locus of action in animals, not by studying their behavioral effects, concludes Dr. Tobach.

SEX PATTERNS

Hormones and Aggression

Male hormones supposedly play a part in aggression: Males in most mammalian species fight more than females and androgens—male sex hormones—have been implicated as a cause.

New evidence from Stanford University bears out the androgen-aggression link, but in a very specific way.

Male hormones must be present at birth if a rat is going to display male-type fighting behavior as an adult. If the animal is castrated at birth, no amount of testosterone, an androgen, will reverse its feminization and thus its weaker fighting response.

But if the rat is castrated during the weaning stage, an injection of testosterone will quickly return it to the male fighting pattern.

The Stanford work, reported by Dr. Robert L. Conner, fits neatly into a current theory of sexual development which holds that male hormones present at birth physically organize the brain into a male pattern, while the absence of these hormones creates female organization. Thereafter, the action of sex hormones, whether male or female, is regulated by this pattern. By weaning time, the neural processes underlying male and female behavior are apparently already established.

NEUROSIS

Depression Serves Survival

In its original form, mental depression may have been a means of conserving energy and protecting life for animals.

It was then elaborated in humans into something much more complex.

Dr. I. Charles Kaufman of the Downstate Medical Center of the State University of New York, proposes this view of depression.

He says the huddling fetal position assumed by some species of monkey infants deprived of their mothers may be explained as the animals' need to conserve energy and at the same time protect itself from the notice of predators.

This depressive posture follows a period of great agitation when the animal thrashes around and cries loudly. Both agitation and withdrawal have survival value, Dr. Kaufman believes.

Agitation alerts the mother to return; depression conserves energy when she doesn't come.

ZOO KEEPING

Crowded Animals Neither Fight Nor Mate

Animals that normally disperse widely over territory in the wild can learn to live in close social contact with their own kind, but the control they learn is pathological, according to Dr. J. F. Eisenberg of the National Zoological Park in Washington, D.C.

He said the animals become conditioned to live together without bursts of violent emotional reaction. They don't lose the capacity for aggression, said Dr. Eisenberg, but the threshold at which they can be provoked is raised highly. The price paid for such conditioning occurs in reproduction; crowded animals eventually stop producing off-spring.

Dr. Eisenberg worked with a variety of animals including marsupials, shrews, tenrecs and rodents.

GATE THEORY

Animals Raised Without Stimulation

Dogs were raised in cages that blocked nearly all stimulation from the outside world for the first 10 months of their lives. When they came out, the animals froze, then became hyperexcited and went into whirling fits. They learned poorly, and didn't seem to know enough even to avoid a painful electric shock.

Dr. Ronald Melzack of McGill University explains these impairments on the basis of his gate theory of nerve impulse transmission.

Two sets of fibers carry impulses from skin to spinal cord—large, fast conducting fibers and smaller, slower ones with many cellular junctions. According to the Melzack-Wall gate theory, sensory impulses travel rapidly via large fibers to the brain where they activate memories. This information then travels back down the nervous system to act as a filter or gate for incoming sensory signals.

Dogs raised with early restriction lack an adequate gate, Dr. Melzack believes. All sorts of information relevant and irrelevant, goes crashing through to overexcite the nervous system, he says. The dogs remained "loused up" for one to two years, said Dr. Melzack, and even though they won ribbons at dog shows they could not be placed as pets because of the periodic whirling fits.