A monkey blueprint for sexual boredom

The sex life of a rhesus monkey may not interest many people, but Emory University researchers say the results of their four-year study of the subject may help explain some mating peculiarities of human beings. "We're frightfully, frightfully careful — we're tiptoing on a tightrope," Richard P. Michael says about drawing conclusions about humans from monkey tests.

Nevertheless, Michael and Doris Zumpe, both of Emory's Department of Psychiatry, report results "not previously described in primate species." And they indicate in the April 28 SCIENCE that their findings may have implications for human couples. Four adult male monkeys were each paired for two and one-half years with four females who were made "constantly receptive" to intercourse by drug injections. This, in effect, wiped out the sexual seasonality of rhesus monkeys (mating occurs primarily during an 8- to 12-week winter period).

After two years with the same harem, the males' sexual potency had dropped by two-thirds and their avoidance of sex periods had doubled. However, when four "new," similarly treated females were introduced into the cages, male ejaculations more than doubled immediately and their sexual latency periods shrank by half. And when the "old" females were returned four weeks later, potency again plummeted.

It became obvious that the potency changes were dependent not so much on hormonal or other biological factors, but "on the nature of the bond between partners." The implications for humans are both intriguing and reasonable, the researchers indicate, because the results show what monkeys behaved like under the human-like conditions of "no sexual season." And it appears that without such a periodic break, and without variety, the males actually tired of their partners.

Applying such observations to monogomous, human societies, "one would expect a tendency to break and remake consort bonds (with new partners)," say Michael and Zumpe. Short of that, one might also observe periodic changes in "clothing adornments, coiffure and odor" to keep up sex interest, as well as imposed sex lulls, such as menstrual and pregnancy taboos, Lent, "safe periods" and other social constraints.

The monkey findings "in terms of periodicity and variability ... may have something to do with potency difficulties in our society," Michael told SCIENCE NEWS. But he is admittedly reluctant to expand further on the work's cross-species possibilities. Scientists "on one hand are told that they are sitting in their ivory towers if their work has no implications," he says. But if they do focus on such implications, he says, "you get sat on by everyone from the church to Richard Nixon." □

Laurels and limits on Nobel Prizes

Whether coveted or disdained, the Nobel Prizes fascinate U.S. scientists. Members of the National Academy of Sciences paid rapt attention to last week's lecture on the sociology of the prizes, although speaker Harriet Zuckerman warned, "I'm afraid this is not a how-to-do-it speech."

Zuckerman, a sociologist at Columbia University, interviewed four-fifths of the American Nobel science laureates and many officials of the Nobel Foundation. At the annual NAS meeting in Washington she discussed three aspects of her findings: how the Nobel Prizes became supreme among scientific awards; why many excellent scientists miss receiving a Nobel Prize; and the prize's effect on recipients.

The prestige of a Nobel Prize, Zuckerman suggests, comes not from one outstanding characteristic, but from a variety of favorable ratings. She compares it to an athletic competition where the winner may not be first in any event, but still accumulates the highest overall score. The Nobel Prize is not the oldest prize, but 77 years is old enough for respectability. It is not the most opulent prize, but the monetary awards are great enough to establish importance. The laureates are not selected by an international organization, yet the awards have been presented to scientists of 26 countries. In addition to its high cumulative rating, Zuckerman says that esteem of the award comes from the prestige of its past laureates. During its first years, she says ". . . the Nobel Prize received annual infusions of prestige borrowed from the eminent scientists who agreed to accept it."

Of course the Nobel Prizes don't have a perfect record on wisely choosing recipients. Johannes Fibiger is widely regarded as the least deserving laureate because his findings on malignant tumors turned out to be incorrect. The Nobel committees were so embarrassed, Zuckerman says, that they would not give a prize for cancer research for almost 40 years.

The more important problem, according to Zuckerman, is all the scientists who do not receive the prize although their contributions are as great as those of many Nobel laureates. In a few cases the Nobel committees have acknowledged their "error." For example, O. T. Avery was 60 when he discovered that DNA is the hereditary material. The committee put off giving him the award because they were skeptical of the finding, and Avery died before their skepticism was satisfied. (Nobel Prizes are never given posthumously.)

Simple numerical considerations dictate that many outstanding scientists will not be chosen. The annual number of awards has changed little since the prizes were initiated in 1901, yet the number of scientists has grown 30-fold. Zuckerman calls those worthy, but unrewarded, scientists "occupants of the forty-first chair," after the deserving scientists not included in the French academy because it is limited to 40 members.

Additional, predominantly arbitrary, limits are that prizes are given in only four fields. Thus, mathematicians, earth and marine scientists, astronomers, certain biologists and behavioral scientists are not even in the running. Also, traditionally the prizes go to fundamental, instead of applied, science and to discoveries, rather than theoretical advances. The prize may only be given to "recent" discoveries; once a contribution is assimilated into general knowledge it is no longer eligible. Finally, because no more than three scientists may share a prize, awards are usually made for work by an unambiguous, small number of prime investigators. "Because the constraints are, in important respects, out of tune with the developing cognitive and social organization of contemporary science, they can undermine the legitimacy of the prizes by making them seem anachronistic and by creating ever larger numbers of uncrowned laureates," Zuckerman cautions.

Winning a Nobel Prize has different effects on the lives of individual scientists. Zuckerman finds that the impact is greatest on those who are surprised by the award, rather than those eminent scientists, holders of numerous other awards, who have been more concerned with *when* rather than *whether* they will win. Zuckerman cites Einstein as an unmistakable example of an expectant winner. Einstein included the Nobel honorarium in his divorce settlement of 1919, two years before he actually received the award.

However, for some scientists the Nobel Prize is a sudden increase in prestige. Some new laureates are not members of their own national academies, have no major prizes and no honorary degrees. (The United States national academy has elected 79 percent of U.S. laureates before they received the Nobel Prize, Zuckerman reports. Among the 60 new members elected last week is Andrew V. Schally who received the Nobel Prize in Physiology or Medicine last October.

While the prize was intended to be incentive and reward, it also invokes new demands. Zuckerman was told of pressing requests from scientists, officials, journalists, lay groups and — as several reminded her — visiting sociologists. André

Lwoff said, "We have gone from zero to the condition of movie stars. . . . Our lives are completely upset." However, most scientists develop efficient responses to requests. Francis Crick sends out a standard checklist turning down "your kind invitation" to do any of sixteen activities.

Zuckerman used the annual number of published papers as a measure of how a sciicientist's work is affected by receipt of a Nobel Prize. She found that average publication frequency dropped from six papers a year prior to receipt of the prize to four papers afterward. Comparison with a matched control group showed that the decrease could not be explained by increased age, and that even after winning the prize the laureates published twice as much as the control scientists.

In addition to the disruptive influence of winning the Nobel Prize, many scientists are upset because they do not consider the prize-winning contribution their best work. Nearly half the laureates Zuckerman interviewed said had they given themselves the prize, it would have been for something else. Some scientists felt their theoretical work was more important than the recognized empirical contribution. Others were upset the recognition came for a chance discovery. "Anybody could have done that," one laureate said.

Zuckerman believes that the Nobel Prize now is an elaborate social arrangement for identifying scientific excellence in a few symbolic cases. But she concludes, "We do not yet know whether the prizes have advanced science or significantly affected its directions of development." □

Learned response pinned to brain cells

At the tone, the rabbit slips a protective membrane over its eye. It has learned that the sound is usually followed by an unpleasant puff of air. Somewhere in the brain, nerve cells have been altered by the rabbit's past experience.

To discover how cells change during learning, biologists must first determine which cells are involved. Richard F. Thompson reported to the annual meeting of the National Academy of Sciences in Washington last week that he and colleagues have identified neurons that participate in recognizing an association between the events in classical conditioning. Those cells then influence other parts of the brain. Now further research can focus on those neurons, the pyramidal cells of the hippocampus.

The rabbits' blink is the American answer to Pavlov's dogs' salivation response, says Thompson of the University of California in Irvine. Thompson and colleagues looked to the hippocampus, a folded layer of cells deep inside the brain, for the substrate of conditioned learning. A wide variety of experimental and clinical situations have implicated the hippocampus in learning and memory.

Thompson first recorded the signals of small groups of nerve cells. He found that activity increases when the tone and the air puff are presented as linked events. The activity is not increased by the air puff and tone when they are not part of a conditioning sequence.

The response in the hippocampus appears far earlier than the conditioned behavior of the eyelid (the nictitating membrane). Sometimes the hippocampal activity is apparent by the second training trial. "It is perhaps the earliest sign of training," Thompson says. "The hippocampus has learned that something is about to happen."

Thompson has also traced the signs of training to a subsequent brain region. Neurons of the hippocampus send processes to the lateral septum, but not to the medial septum. Thompson finds an increased activity in the lateral septum in response to paired, but not unpaired, tones and air puffs. The medial septum, which sends processes into the hippocampus but does not receive hippocampal output, shows no response to paired stimuli. Increased activity appears in the lateral septum after its rise in the hippocampus.

The learning-related activity in the hippocampus originates in just one class of nerve cells, recent experiments by Theodore Berger and Thompson indicate. Research, which is reported in the March PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, implicates the pyramidal cells, neurons that carry information out of the hippocampus. At least 75 percent of the pyramidal cells in the areas studied show increased activity during training. Another class of neurons was found to decrease their activity during the conditioning. Thompson believes that the pyramidal cells will be found to be the basis not only for the rabbits' tone-blink response, but also for Pavlov's dogs' salivation after hearing a bell and for other conditioned reflexes. □

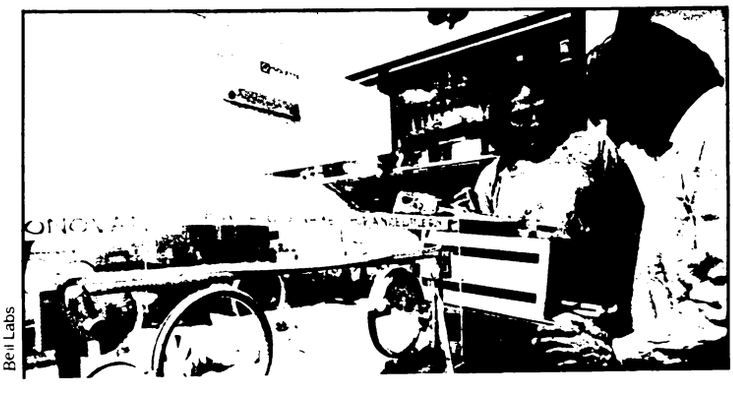
Bilirubin in babies: A better test

The liver is the body's dump and detoxification center. But the developing liver of a newborn can't always handle the load imposed by a rapidly growing, changing body. Toxic products back up in the blood stream. About 10 percent of babies, including most that are born prematurely, can't excrete enough of the body's bilirubin, a breakdown product of hemoglobin, the coloring and oxygen-carrying molecules in red blood cells. If too much bilirubin accumulates in the blood, it oozes into the body tissues and causes jaundice. More serious, it also seeps into the baby's brain and causes irreversible damage. High bilirubin levels have also been associated with the occurrence of crib death (SN: 4/15/78, p. 234).

Researchers at Bell Telephone Laboratories have developed a new quick and easy test based on fluorometric analysis that gives more, and perhaps more critical, information than the fast tests now available. The currently used quick tests only measure total bilirubin. Dr. Angelo A. Lamola reported at the recent annual meeting of the Society for Pediatric Research in New York City that the new, five-minute test not only measures total bilirubin, but also determines how much more of it the blood can safely carry.

Bilirubin latches onto albumin, a serum protein. When the bilirubin overloads the albumin, the trouble begins. The excess bilirubin crosses the blood-brain barrier and does the damge. The new test measures how much reserve albumin there is for bilirubin to bind. If the albumin is completely overtaxed, the baby may require a complete blood transfusion. Other tests can also give this information, but they take 10 times longer and involve complex chemistry.

The technique capitalizes on the fact that when bilirubin is either bound to blood albumin or treated with a detergent, it will fluoresce green light when exposed to blue light. This light can be captured and measured. Three drops of blood are needed for the test. One drop is measured to determine how much bilirubin is bound to albumin. Another drop is treated with detergent to measure total bilirubin. The third is combined with excess bilirubin to measure any previously unoccupied albumin in the blood sample. This technique is already used to measure lead levels in blood as a test for lead poisoning. □



Bell Labs

A hemato-fluorometer helps determine risk of brain damage to jaundiced infant.