behavioral sciences

Visual deprivation and the brain

Experiments have shown that a wide range of visual stimulation is necessary for the development of normal vision. Without such stimulation, it is hypothesized, visual pathways in the brain do not mature. Kittens allowed to see only vertical lines, for instance, are not able to see horizontal lines later in life (SN: 11/6/71, p. 313). Similar experiments are not practical with humans, but there is now vision. Without such stimulation, it is hypothesized, visual experience can modify the human brain.

Ralph D. Freeman and Larry N. Thibos of the University of California at Berkeley studied visual responses of subjects with ocular astigmatisms. To an astigmatic eye, contours of a specific orientation appear blurred. If the defect is present during early years, the researchers suggest, the lack of exposure to well-defined stimuli of the affected orientation could result in the brain's inability to ever properly define or visualize such stimuli. For instance, some cases of astigmatism persist even when refractive errors have been completely neutralized with lenses. The researchers conclude in the May 25 SCIENCE that such defects are not in the eye but in the brain. Their electrophysiological studies show that some subjects who have an astigmatism also have corresponding differences in a component of the brain's electrical activity.

Worldwide shortage of opium

Morphine was first isolated from opium in 1803. It quickly became and remains the most effective drug in the relief of severe pain. Codeine, which is synthesized from morphine, has been used orally for more than 100 years in the treatment of moderate pain. It is second only to aspirin in usefulness as a mild analgesic. William Beaver, associate professor of pharmacology and anesthesiology at Georgetown University, warned last week of a worldwide shortage of opium for medical use.

Speaking at an international symposium on pain, Beaver said the U. S. Government's attempts to eliminate the cultivation of the opium poppy (and, therefore, heroin) is resulting in an incipient shortage of opium alkaloids and their synthetic derivatives. "The patient," he said, "may therefore suffer from the nonavailability of these drugs, not only by having a less thoroughly investigated and understood drug substituted for one whose therapeutic potential and adverse effects have been more extensively studied, but also because his physician has been deprived of the therapeutic tools with which he is most familiar."

A new narcotic antagonist

Narcotic antagonists, drugs that block the effects of opiates, have been suggested as a partial answer to heroin addiction. Two such antagonists have been investigated but their use has been limited. One, cyclazocine, produces unpleasant side effects (nervousness and irritability) and the other, naloxone, is relatively short-acting (12 hours). At the meeting in May of the American Psychiatric Association, a more effective narcotic antagonist, naltrexone, was described.

Richard B. Resnick of New York Medical College reported that naltrexone is being used effectively in a pilot program with 30 addicts. The drug is nontoxic, provides immediate 24-hour protection and can work for up to 72 hours once a system of dose increments has been introduced. The program also includes regular counseling by a social worker about jobs, housing, schooling, welfare, medical, psychiatric and personal problems.

biomedical sciences

Aspirin may help relieve sickle cell anemia

Sickle cell anemia is a blood disease that afflicts 50,000 blacks. Abnormally structured hemoglobin (a protein that gives red blood cells their color) changes red blood cells into the shape of sickles. As a result, the red blood cells have trouble getting through the body's smaller blood vessels. A painful sickle cell crisis can last days or weeks. There has been no effective treatment.

But now, Irving M. Klotz and Joseph W. O. Tam of Northwestern University have found that aspirin might help patients with sickle cell anemia.

Recent studies had shown that the chemistry of abnormal hemoglobin can be changed by the chemical cyanate. The altered hemoglobin appeared to be such that it would not cause as severe sickling crises as those caused by the regular abnormal hemoglobin. So the Chicago biochemists wondered whether chemical alteration of abnormal hemoglobin might not be an effective treatment for sickle cell anemia. Since cyanate is not acceptable for human use, they looked for another drug that might alter the abnormal hemoglobin. They report in the May PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that aspirin can modify abnormal hemoglobin and "should be an attractive candidate as a substance that can prevent or inhibit the onset of red blood cell sickling."

Cancer research: Spreading the word

Under the National Cancer Act of 1971 (SN: 5/13/72, p. 309), the National Cancer Institute must collect, analyze, store and disseminate cancer research information on a national and international basis. NCI's Cancer Information Service was launched last week.

The service will start by tracking down cancer research data from over the world. It will find out which cancer researchers are doing what in which countries. It will determine the kind of cancer information clinicians and scientists need and how it can get information to them.

"This information system," declares Richard Holt, chief of the Management and Scientific Information Systems Branch of NCI, "must help scientists and clinicians hasten the delivery of the fruits of their labors to cancer patients and the world community."

Immune response to nerve chemical

Acetylcholine is a chemical compound released at many nerve endings. It is believed to serve as a transmitter of impulses between adjoining nerves. Adjoining nerves have chemical receptors that receive the message in acetylcholine.

In the May 25 SCIENCE, Jim Patrick and Jon Lindstrom of the Salk Institute report that they injected rabbits with highly purified acetylcholine receptor material taken from eels. The rabbits made antibodies to the foreign receptor material. The rabbits were given another injection of receptor material. This time they became paralyzed.

These findings suggest that foreign nerve chemicals caused an immune response. The immune response destroyed the animals' normal acetylcholine receptors as well as the foreign receptors. As a result, the animals' normal nerve-muscle actions were blocked.

Might some people form antibodies against their own acetylcholine receptors so that they become paralyzed? The San Diego neurobiologists think so. There is a disease where patients experience paralysis similar to that observed in the rabbits.