BIOMEDICINE

Joanne Silberner reports from New York City at the meeting of the American Pain Society

Psychosurgery sans psychataxia

When the benefits of frontal lobotomy proved far fewer than the problems, that psychosurgical technique went out of vogue. But some researchers did not give up the search for a surgical cure for psychiatric disturbances. According to psychologists at the Massachusetts Institute of Technology, cingulotomy, a psychosurgical procedure performed on a small scale in the United States on pain sufferers and persons with severe psychiatric disorders, does not result in the neurological and psychological side effects of frontal lobotomy.

While cingulotomy's effectiveness in permanently alleviating pain is still a matter of debate, Suzanne Corkin and a large team of researchers have failed to find evidence of any lasting neurological or behavioral defects in the evaluation of 137 cingulotomy patients one month to ten years after the operation. In fact, Corkin notes, the patients' IQs increased following the procedure. "On days when you're in pain you don't work as efficiently as you could," she explains.

The one difference the researchers did find was in the patients' ability to redraw a complex figure. Patients older than 30 years of age copied the figure more accurately before their operations than afterwards. Representing only one difference in a slew of tests, the defect, says Corkin, is "inconsequential."

Anti-enzyme suggested as pain reliever

The discovery five years ago of enkephalins — potent pain relievers manufactured by the body — brought hopes to pain sufferers, drug companies and researchers that enkephalins could be used to produce a safe, effective, non-addictive pain reliever. It has since been found, however, that both naturally occurring and synthetic enkephalins are rapidly destroyed by enzymes. Their pain relieving ability lasts only a few minutes.

University of Chicago researchers led by Seymour Ehrenpreis and R. C. Balagot think they may have found a way around this problem—inactivating the enzymes that inactivate the enkephalins. The researchers gave D-phenylalanine (DPA), an amino acid that blocks the enkephalin-inactivating enzyme, to more than 100 persons whose chronic pain could not be alleviated by other treatments. Little happened during the first two weeks, they report, but by the third and fourth weeks almost 80 percent of the patients claimed significant reductions in pain. Other substances, including some antibiotics, were found to be more effective than DPA at blocking enkephalinases, the enzymes that break down enkephalins. In a limited series of drugs, the researchers found "a direct relationship between inhibition of enkephalinases and potency as an analgesic."

The DPA showed unique advantages over conventional narcotics: The dosage, instead of having to be increased with time, could be cut; no withdrawal symptoms occurred after long-term administration; and side effects were absent or mild. "Increasing the enkephalins in the body by preventing their destruction may prove to be the ideal way to abolish pain," the researchers conclude.

Pain and pleasure

Sex, at least for rats, may be the best remedy for pain. Barry R. Komisaruk of Rutgers University in New Brunswick, N.J., reports that vaginal stimulation is a potent analgesic for rats. When a force is applied to the cervix, there is "an immediate and powerful suppression" of the rat's reaction to pain stimuli administered by heat or electric shock to the tail. With a great enough force, the rats failed to respond even when the tissue of the tail was damaged. The stimulation is pain-killing rather than immobilizing, Komisaruk says.

EARTH SCIENCES

Catching the drift of Arctic research

In 1893, the Norwegian explorer Fridtjof Nansen froze his ship, the *Fram,* into the Arctic ice pack near the New Siberian Islands to test his theory that an Arctic current would carry the ice and its cargo across the pole to Greenland. Last spring, borrowing Nansen's method as well as the name of his ship, U.S. and Canadian researchers carried out their own Arctic investigations.

The object of Fram 2 — and of the series of expeditions that began last year with Fram 1 (SN: 3/24/79, p. 185) — is to begin to fill in the largely blank charts of the Arctic Ocean basin. After relocating twice because of "unanticipated ice dynamics" — meaning sudden cracks that developed in the ice and threatened to break camp the hard way — Fram 2's main camp and two companion camps drifted with the ice pack approximately 40 miles across the Pole Abyssal Plain of the eastern Arctic Ocean. With about 25 researchers on-ice and about 50 more providing air support, a variety of acoustic experiments were carried out to examine the nature of the Arctic Ocean waters and crust. Based on the reflections of sound waves from underwater explosives, the scientists will be able to map the contours of the ocean crust and learn something of its composition and origin. They will also learn more about the way sound travels in the cold surface waters of the Arctic, which are unique because they are dominated by the sounds of the cracking and moving ice cover rather than by the sounds of distant ships.

Sponsored by the Office of Naval Research, the expedition was led by Arthur Baggeroer of Woods Hole Oceanographic Institution and Ira Dyer of the Massachusetts Institute of Technology, and included researchers from eight U.S. institutions and the Bedford Institute of Oceanography in Dartmouth, Nova Scotia.

The bottom line on ocean winds

The ocean breezes that are tickling late-summer beach-goers are serious stuff to weather forecasters and oceanographers: They are part of the inadequately understood coupling between the ocean and the atmosphere as well as the major force behind ocean circulation. Yet they are inadequately studied, says University of Rhode Island oceanographer David L. Evans. In addition to providing too few observations, traditional means of collecting wind data, by ship and by instrumented buoys, are unsatisfactory, because ships avoid regions of high winds and because buoys are both expensive to moor and easily damaged.

To overcome these problems, Evans and D. Randolph Watts are developing a device that measures surface wind speeds and possibly rainfall while resting on the ocean bottom. The instrument, called a WOTAN (Weather Observation Through Ambient Noise), depends on the fact that the level of ambient noise in the ocean at frequencies higher than 1,000 hertz is related to the roughness of the sea or to the speed of the wind at the surface. For example, explains Evans in the September MARITIMES, for each rainfall rate, the sound level is the same at all frequencies, while for a given wind speed, the sound level decreases as the frequency increases. The WOTAN amplifies and filters the ambient noise at three different frequencies to derive wind speed — though not direction — and, less accurately, the amount of rainfall.

So far, WOTAN has had two successful "wet runs." In the first trial at 1,800 meters of water between Scotland and Iceland, WOTAN measured wind speeds that differed less than one knot from surface buoy measurements. (One meter per second equals two knots; satellite-measured wind speeds are accurate to 4 knots.) Comparisons with rainfall data have not yet been made. WOTAN's next experiment, says Evans, is to measure coastal winds off Cape Hatteras, N.C.