

some 3,000 pain patients a year, and many suffer agonizing, constant central nervous system pain whose origin is hard to pin down compared to pain originating in the peripheral nervous system. The origin of the latter is easy to diagnose—for instance, pain resulting from a tumor pressing against the pelvis or pain originating in arthritic joints. Whereas drugs, acupuncture or spinal cord stimulation can help relieve pain of peripheral origin, it rarely helps patients with pain of central origin. So Jane and other neurosurgeons often sever these patients' spinothalamic tracts in select areas to relieve pain.

Such nerve deletion, Jane says, is "encouraging, but by no means uniformly successful." What often happens is that other nerves in the brain and body find ways of reacting to the same pain stimulus, whatever it is, so that pain returns. In fact, the patient's pain is frequently even more severe the second time around as if the nerves, in being frustrated in their pain expression, find even more diabolical ways to torment people.

But even the forebrain is probably not the ultimate nerve switchboard of pain processing. When patients with constant, overwhelming central pain finally have no recourse other than a lobotomy, which consists of severing nerves in the forebrain, they still feel pain, Jane reports. So some other nerves than those in the forebrain must be assisting this pain expression. But which ones? Researchers have yet to identify them.

Even if the ultimate seat of pain expression were identified, it would undoubtedly not completely explain pain, because pain appears to be as much one's emotional reaction to the physiological stimulus as the stimulus itself. (Which brings us full circle after 2,000 years to pain as a "passion".) For instance, while lobotomized pain patients say they can still feel pain, they also admit that it no longer bothers them, suggesting a change in attitude toward the pain.

At first glance, a lobotomy sounds like the ideal treatment for central pain patients. But unfortunately it carries grave risks. In some patients it adversely affects personality or intelligence. So Jane is pessimistic about treatments that are currently available to help these patients. But he is optimistic that science can come up with better approaches. The other pain authorities at the seminar agreed with him. They believe that the best way they can help these patients, and all pain patients, for that matter, is by better understanding the physiology and biochemistry of pain. And at the moment they have a hot lead.

Within the past year, John Hughes of the University of Aberdeen, Scotland, and several other biochemists have identified a molecule naturally present in the brain that has the same affinity for nerve cells that morphine has and that is blocked by the same agents (SN: 11/22/75, p. 327). Hughes has since purified the molecule

and has synthesized it. It's a peptide; he calls it "enkephalin."

John C. Liebeskind, a psychologist and pain researcher at the University of California at Los Angeles, visualizes the synthetic enkephalin or a chemical analog of it being used to treat pain patients without some of the side effects of morphine. But Perl isn't particularly confident that enkephalin really is the answer since it would probably be tough to get it to reach a targeted pain area of the body. He is

confident that enkephalin is going to open new avenues to understanding the nervous system and treating neural disorders including pain. Polypeptides similar to enkephalin have now been found in sensory neurons and other neurons of the central nervous system, and some of them act as neurotransmitter chemicals. So it's possible that there may be a network of pain-relieving neurotransmitters in the central nervous system, and that they may eventually be manipulated to relieve pain. □

CIA climate report: Assessing impact

A just-released internal working paper of the Central Intelligence Agency concludes that apparent climate changes will result in new political alignments among nations to insure a secure supply of food and that "assessing the impact of climatic change on major nations will, in the future, occupy a major portion of the Intelligence Community's assets." The report, prepared by the CIA Office of Research and Development, calls for "decisive action" in developing new methodologies for climate forecasting and impact assessment.

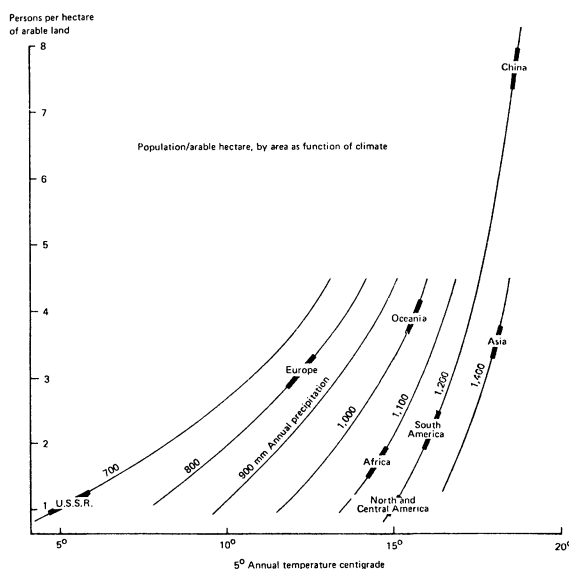
"The western world's leading climatologists have confirmed recent reports of a detrimental global climatic change," says the report—a change that "brings a promise of famine and starvation to many areas of the world." Traditionally, such climate changes have been countered by migration to more favorable areas, but now "the world is too densely populated and politically divided to accommodate mass migrations." Though intelligence agencies do not yet have analytical tools capable of predicting what accommodations will occur, "the economic and political impact of a major climatic shift is almost beyond comprehension."

The study contains no startling new scientific revelations—the basic climatological data has been discussed for years (SN: 3/1/75, p. 138). Indeed, the report was prepared in August, 1974, some four

months after the agency sponsored a meeting of climatologists in San Diego to resolve differences of opinion. There the authorities were able to reach a consensus on at least some key issues: that a global climate change is indeed taking place; that a reversion to favorable conditions will not soon occur; and that increased variability in climate conditions affecting crops is highly probable.

The study borrowed heavily from the pioneering work of climatologist Reid Bryson and his colleagues at the University of Wisconsin (SN: 12/13/75, p. 381). From this work, the CIA concluded that if the climate should return to that of the "Little Ice Age" (A.D. 1600 to 1850) India could support only three-fourths of its present population, China would need to import as much as 50 million tons of grain a year to prevent famine, the Soviet Union would lose Kazakhstan for grain production, and Canada would lose 75 percent of its grain export capacity.

Unfortunately, the report suffered a sloppy debut that could only hurt its chances for stimulating useful discussion. Some news stories credited Bryson with writing the report, which the CIA, with its traditional secrecy, would neither confirm nor deny. (Individual authors outside the agency do occasionally receive contracts to produce this sort of work.) Other rumors had the climatologist at least mak-



The effect of climate changes: As temperatures drop, the number of people sustained by arable land decreases. Europe, for example, now supports three persons per hectare; if the temperature drops three degrees, only two people could be supported.

ing the report public. When SCIENCE NEWS contacted Bryson, he not only denied having written this report, but also said he had never received any contract from the CIA. He said that on at least one point the report had even misinterpreted his work—erroneously concluding that India was in danger of suffering a drought every four years. He said the report rated “a ‘B’ in content and a ‘C’ in style.”

SCIENCE NEWS has also learned that the report was made public accidentally through the office of Rep. Frederick W. Richmond (D-N.Y.), who had requested that the study be declassified for use by the House Agriculture Committee. A spokesman for Richmond said a reporter who had received an advance copy broke the release date, which was to have been just before a meeting the Congressman was putting together between climatologists and some of his colleagues. The original story made no mention of the fact that the report was two years old and was only an internal working paper—not an official statement of CIA position.

Such caveats aside, however, the report still gives an intriguing insight into the government's consideration of what could yet be the crisis of the century. Even as the State Department was pushing grain deals with Russia and the Agriculture Department was minimizing the threat of climate change, the CIA was quietly warning: “Climate is now a critical factor. The politics of food will become the central issue of every government.” □

Asbestos in water

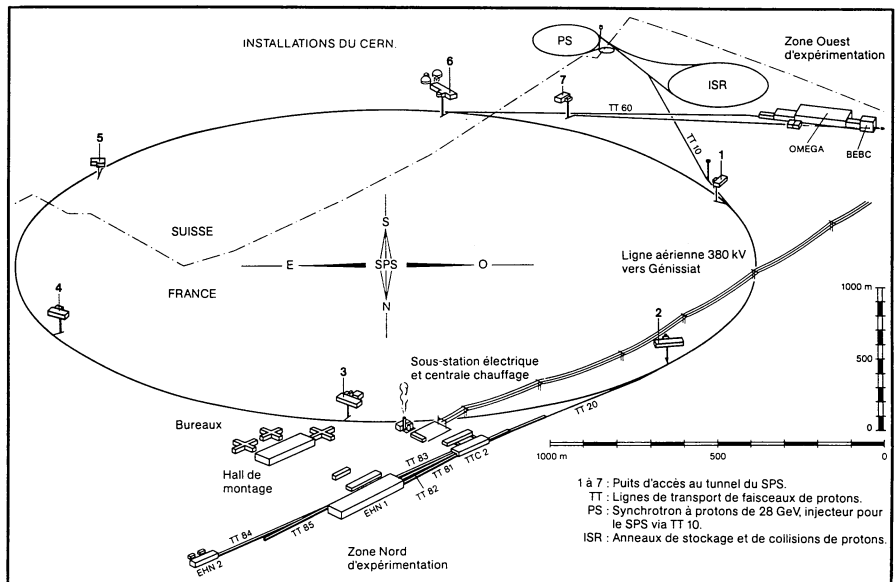
Initial results of a two-year study of the drinking water in 10 U.S. cities reveal measurable amounts of asbestos fibers in the water supplies of Boston, Philadelphia, Atlanta, San Francisco and Seattle. Such fibers are suspected of causing cancer, but what the potential risks may be to people drinking such contaminated water has not been determined.

“Asbestos” is actually a broad term for a large group of fibrous silicate minerals used in textiles, building materials, brake linings and fireproofing materials. They may enter the water through natural contamination, due to runoff from suitable geologic formations, but the Environmental Protection Agency, which announced the findings, has not yet been able to determine how much of the fiber in the water tested came from natural sources or from industry.

No asbestos was detected in the water supplies of New York City, Chicago, Dallas, Kansas City or Denver. Results from measurements in 20 other cities should be available soon. The present study indicates that filtration can substantially lower asbestos content in water.

More study would be needed, EPA said, to determine potential hazards of the fibers and set standards. □

Protons in the Super Proton Synchrotron



The Super Proton Synchrotron at the CERN laboratory in Geneva will be Europe's largest and most energetic proton accelerator. Like the synchrotron at the Fermi National Accelerator Laboratory it will reach energies up to 400 billion electron-volts. Essentially complete, the SPS is now undergoing tests and commissioning exercises. On May 3, a (low-energy) beam of protons successfully navigated its 6,900 meter circumference for the first time.

Straddling the French-Swiss border, the SPS is built entirely underground. Access

is by seven wells (numbered in the drawing). It will deliver accelerated protons to two experimental areas, called north and west. The laboratory's older Proton Synchrotron (PS in the drawing), which was in its day Europe's largest accelerator, will serve as a pre-accelerator for the super synchrotron. The older synchrotron, with a top energy of 30 billion electron-volts, also supplies accelerated protons to the Intersecting Storage Rings (ISR), CERN's other major piece of equipment, which collides two proton beams with each other. □

Ford signs science adviser bill



President Gerald R. Ford signs the National Science and Technology Policy, Organization and Priorities Act, renewing the office of White House Science Adviser. Behind him, looking on, are three men instrumental in the act's passage: Vice President Nelson Rockefeller, Sen. Frank E. Moss (D-Utah) and Rep. Olin E. Teague (D-Tex.).

Susan Strasburger