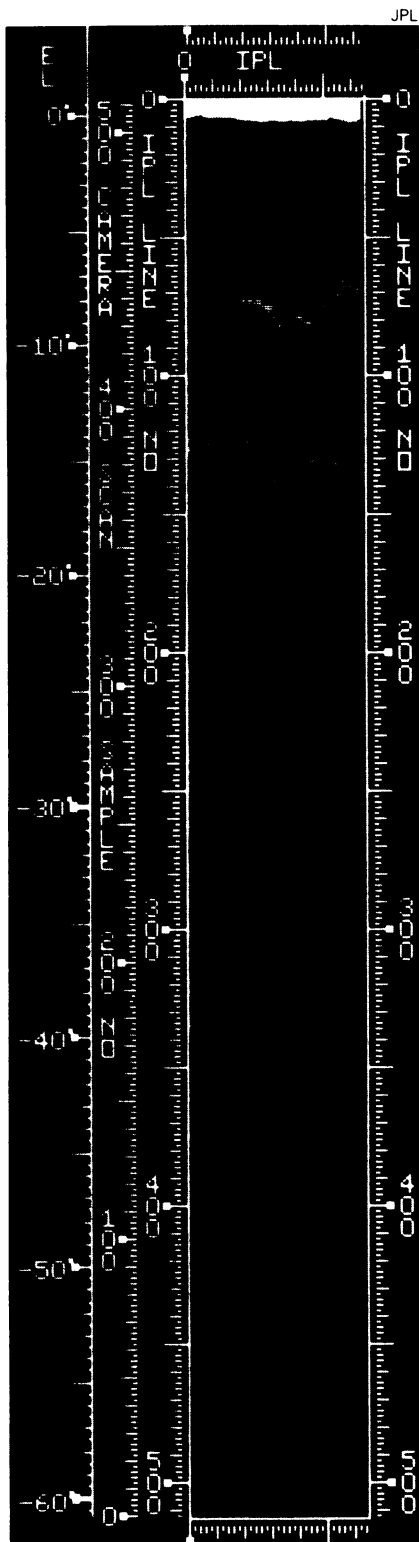


SCIENCE NEWS of the week

Viking's Odyssey: End of the Ending

A thin white line extended across the black monitor screen, as flat as the electrocardiogram of a corpse. On the evening of Jan. 21, as the appointed time drew near, a group of people in a room of building 230 at Jet Propulsion Laboratory in Pasadena stared at the screen, willing the line to suddenly develop a sharp vertical spike that would signal the return to life. There was little hope, however, and when the line failed even to shudder as the moments passed, the emotions of the onlookers did not include surprise.

The spike would have signaled that the National Aeronautics and Space Administration's Deep Space Tracking Network had picked up a message from Mars — the first report from the Viking 1 landing craft since it fell mysteriously silent more than five months ago. Reaching the Martian surface on July 20, 1976, it was designed to operate for three months but kept working for more than six years. Its message of last Nov. 13 appeared on schedule, complete with a typically sharp photo taken as part of a series to monitor the scene over time under identical lighting conditions to seek changes in the ground and atmosphere. By then under the automatic control of its own computer, it was programmed to operate through 1994. But its next message, expected



Viking's last photo of Mars was taken by Lander 1 on Nov. 5, 1982, after 2,238 Martian days (2,299 earth days) on the surface, and radioed to earth on Nov. 13. The dark-looking ground and diffuse-edged shadows suggest that a dust storm first spotted weeks earlier was still underway.

on Nov. 19, never came. With no incoming data to aid in a diagnosis, engineers at JPL and elsewhere struggled to understand the problem and transmitted numerous attempts at remedial computer commands, but to no avail. An already programmed instruction for the craft to start sending on its own if it did not hear from earth for nine consecutive weeks produced nothing when that message was due on May 5, nor did two final efforts to trigger a response by ordering the craft to reconfigure components of its transmitter.

The obvious things had all been tried, and several less so (members of the now-tiny Viking team once sought out the computer in the Viking lander at the National Air and Space Museum for comparison tests), but VL-1 on Mars stood mute, after the expenditure of five months of time, effort and money. "It will be my recommendation," said project manager George Gianopolos of JPL, drafting a status report on the May 21 events for NASA headquarters, "that further attempts be terminated, and that the Viking Lander Monitor Mission be declared ended."

The other Viking lander and the two orbiters had already stopped working. The vast project, begun a decade and a half ago, has wound down. "A piece of history," says Geoffrey Briggs of NASA, "is now over."

—J. Eberhart

Hormone aberration-anorexia link found

Most of the symptoms of anorexia nervosa are by now well known: the obsession with thinness, the tendency to exercise excessively, amenorrhea. But there are other less well known symptoms, including urinary defects: anorectics seem to urinate too much, and even when extremely dehydrated they seem unable to hold normal amounts of water in their kidneys. Government scientists have now linked this symptom to abnormal hormonal activity — an abnormality that may help to explain the mental aberration associated with self-starvation.

According to psychiatrist Philip W. Gold and his colleagues at the National Institute of Mental Health in Bethesda, Md., anorectics appear to have a defect in the so-called "osmoreceptor" in the brain's hypothalamus — the receptor that signals the pituitary gland to secrete the anti-diuretic hormone called vasopressin. Normally when a person eats a lot of food that is heavily laced with salt, the high level of sodium in the body fluid causes the osmoregulatory cells to shrink, which in turn triggers a rise in vasopressin; vasopressin tells the kidney to hold on to water, so that the concentrated sodium can be diluted and excreted. In anorectics this regulatory mechanism appears to have gone awry.

As reported in the May 12 NEW ENGLAND JOURNAL OF MEDICINE, Gold gave heavy doses of a salty solution to normals and anorectics (while extremely underweight, during and following recovery). While the normal subjects (and depressed and schizophrenic patients as well) responded to the saline solution with a direct increase of vasopressin in their blood, the anorectic patients did not: they had either a deficient vasopressin response or, more commonly, a completely random response.

Gold notes that the anorectics also tended to have abnormal levels of vasopressin in the cerebrospinal fluid; but instead of being random, the vasopressin in the CSF appeared to be high. Vasopressin has been shown to improve memory in laboratory animals by strengthening the coding of information, and the excess vasopressin in the CSF (which bathes the brain cells) could explain the abnormally strong coding of certain thoughts in anorectics — notably the persistent thoughts about weight.

The abnormal vasopressin secretion disappeared as the anorectic patients recovered — but very slowly, Gold says. What may happen, he speculates, is that anorectics become preoccupied with slenderness for psychological reasons, but as they lose weight they trigger hormonal abnormalities. These abnormalities

may cause abnormal eating and drinking behavior; the same kind of random hormonal response has been detected in very obese patients as well. And while it may not be a permanent pathological feature of anorexia, Gold concludes, it is a "strongly entrenched defect that is not easily corrected by improved nutrition."

—W. Herbert

Pre-psychosis': Key in brain waves?

In an age where serious emotional disturbances are attributed increasingly to brain chemical imbalances and treated with psychoactive drugs, it would be ironic if some such psychoses were found to be preventable through biofeedback, meditation or yoga. Yet this is what a group of researchers suggest on the basis of their recent studies of the brainwaves of children of schizophrenic parents.

The research took place in Copenhagen, Denmark, where behavioral scientists for decades have been conducting family studies of schizophrenia and depression. From a pool of more than 9,000 youngsters, 71 "very high risk" children of schizophrenic parents were selected for this latest study and matched against 71 children of healthy parents.

The investigators, led by Turan M. Itil, director of research in biological psychiatry at New York Medical College in Valhalla, N.Y., used several types of computer analyses to evaluate the brain waves of each group. Their findings, they reported at the recent meeting of the American Psychiatric Association, were "striking": the electroencephalogram (EEG) patterns of the youngsters at high risk were consistently different from those of the control group. Specifically, the children of schizophrenic parents exhibited more waves that were either very slow or very fast, and produced significantly fewer alpha waves — moderately slow brain waves that are believed to signal calmness and relaxation. The findings match EEG differences found in studies of adult schizophrenics compared with normals, according to the researchers. Such EEG deviations are believed by some to reflect abnormal activity in the brain cortex of schizophrenics.

Moving into what they concede to be a highly speculative area, the researchers suggest these unhealthy brain patterns might be alterable before the late teenage years that seem critical in the development of schizophrenia. (They estimate that 10 to 15 percent of high-risk children will become schizophrenic.) While antipsychotic drugs do counteract EEG problems, they note, such drugs also carry neurological side effects. But early brain wave modification through mind control methods such as biofeedback "could prevent the outbreak of actual illness," they postulate.

—J. Greenberg

Love Canal: No chromosome changes seen

A new Centers for Disease Control study finds no increased incidence of chromosome damage among persons who lived in the Love Canal region of Niagara Falls, N.Y. However, authors of the study caution against interpreting the results as necessarily exonerating toxic chemicals, leaking from an industrial-waste dumpsite at Love Canal, from causing adverse health effects among area residents. Such interpretations are unwarranted at this time, CDC researchers say, not only because of limitations associated with the design of their specific study, but also because no one yet fully understands how chromosome changes correlate either with chemical exposures or with risks of problems such as cancer and birth defects.

Begun in late 1981, the CDC study ultimately involved 55 residents or former residents of the Love Canal community and 40 control subjects (other Niagara Falls residents matched to the Love Canal participants by age, sex and socioeconomic status). Blood samples were obtained, flown to Brookhaven National Laboratory (BNL) in Upton, N.Y., and divided up for use in three different types of chromosome analyses. Though blood was taken from all 95 participants, a few samples refused to grow in culture or were damaged during delays in transport. As a result, a full complement of all three analyses exist for only 88.

Samples to be "karyotyped" were sent to CDC in Atlanta. Karyotyping consists of examining cells as they divide so that their chromosomes can be characterized by pattern, shape, size and number. Though obvious chromosome abnormalities sometimes show up, CDC found normal karyotypes in all samples studied.

BNL and Oak Ridge National Laboratory (in Tennessee) each conducted half of the remaining two analyses. In scouting for "sister-chromatid exchanges," researchers look for where an individual chromo-

some has separated and its pieces re-joined in the wrong sequence. The chromosome-aberration analysis examines individual chromosomes for breaks, gaps, fragmentation, improper fusions of what should be separate chromosomes, and chromosome lesions.

Explains CDC's Clark Heath, one of the study's authors, a certain degree of chromosome damage is normal; typically a small fraction of everyone's cells "have aberrations of the type we studied." And among the study participants, except for one subcategory of chromosome aberrations, no statistically significant differences were found between the Love Canal and control groups. Ironically, in the exception, it was the control group that showed a higher incidence of damage (specifically, "chromatid deletions" and "chromatid lesions"), relative to a segment of Love Canal participants (28 persons) who had been living in homes directly adjacent to the dumpsite (and in whose homes EPA had detected basement air readings, during a 1978 survey, that were high in toxic chemicals identical to those leaching from the dumpsite).

Before attempting to interpret the study's findings, "there are certain caveats that should be mentioned," points out Matthew Zack, another of the study's authors. Since the number of people involved was small, it's possible some effect didn't show up. And because the Love Canal residents tended to be studied from 1 to 3.5 years after they evacuated the area, signs of the damage might have largely disappeared (by sick cells dying out or repairing). Chromosome damage may even have occurred on a level too subtle to be picked up in the current tests. Most important, Heath notes, "the data don't even exist yet" to scientifically link high levels of chromosome abnormalities with a direct risk of developing cancer, birth defects or disease.

—J. Raloff

Research center for Texas

Austin, Tex., has won an intense competition to house the headquarters and laboratories of a major, private computer research center. The Microelectronics and Computer Technology Corp. (MCC), a joint research venture of 12 high-technology companies (SN: 3/12/83, p. 167), announced its decision last week after evaluating proposals from more than 50 cities.

Admiral Bobby R. Inman, MCC's president and chief executive officer, said one criterion for selection was access to nearby universities with strong programs in computer science and electrical engineering. Both the University of Texas in Austin and Texas A&M University promised to strengthen their programs. □

AIDS hits heterosexuals

Researchers at the Montefiore Medical Center in New York now have evidence that acquired immunodeficiency syndrome (AIDS) (SN: 5/21/83, p. 324) is sexually transmitted between heterosexual men and women, raising the possibility of AIDS as a "potential threat" to the health of the general population. Carol Harris and colleagues report a study of seven female sexual partners of men with AIDS in the May 19 NEW ENGLAND JOURNAL OF MEDICINE. Six of the men were intravenous drug abusers and the other was a former homosexual. Of the women studied, one had the full-blown AIDS, while five others had either generalized lymphadenopathy or other symptoms associated with AIDS. One had no symptoms. □