

A Voyager goes the distance

On Feb. 17, the venerable Voyager 1 spacecraft became the most distant explorer in the solar system. Breaking the record held by another old-timer, Pioneer 10, the 20-year-old Voyager 1 is now more than 10.4 billion kilometers from Earth. That's more than double Neptune's average distance from the sun and almost 70 times the distance between Earth and the sun.

Hurling through the deep freeze of the outer solar system at 17 km per second, Voyager 1 is nearing the edge of the heliosphere, the vast bubble of gas in which the sun's magnetic field reigns supreme. No craft has ever reached that boundary, so both Voyager 1 and its sister craft, Voyager 2, which lags about 2.25 billion km behind, will gather the first evidence of its structure.

The sun maintains the heliosphere by expelling a steady stream of charged particles, known as the solar wind. This wind travels at supersonic speeds, but at the boundary of the heliosphere, where it encounters charged particles and magnetic fields from interstellar space, it slows abruptly. The two Voyager craft will cross this deceleration zone, called the termination shock, before they reach the heliosphere's edge.

Voyager 1 is likely to reach the termination shock, which lies 12 billion to 13.5 billion km from the sun, during the next 3 to 5 years, says Edward C. Stone, Voyager project scientist at NASA's Jet Propulsion Laboratory in Pasadena, Calif. Voyager 2 is expected to follow suit about 5 years later.

Stone bases his estimates on the increasing intensity of cosmic rays detected by the craft. Cosmic rays arise from the interaction between charged particles and magnetic fields at the heliosphere's edge. An increase in this radiation indicates that the craft are approaching the boundary. In about a decade, adds Stone, Voyager 1 will leave the heliosphere and become the first known craft to enter interstellar space.

Both craft, which use 20-watt radio transmitters to relay data, have enough electric power and fuel to last until about 2020. —R.C.

Solar eclipses—on Jupiter

When the daytime sky darkened abruptly over Panama, northern South America, and the Caribbean Sea on Feb. 26, skywatchers in the Western Hemisphere got their last view of a solar eclipse in this century. Solar eclipses are far from rare, however: The moon casts its shadow on Earth, blocking out the sun, twice each year.

The 16 known moons of Jupiter cast their tiny shadows on the giant planet much more frequently. Nearly every day, at least one of the moons eclipses a bit of the sun for several hours. Only once or twice each century, however, do three Jovian moons throw their shadows on the same area of the planet. Such an event took place on Nov. 10, 1997, when the shadows of three of Jupiter's four largest moons—Io, Callisto, and Ganymede—came within 40,000 kilometers of each other. Two of the shadows then merged.

Using a 24-inch telescope at New Mexico State University in Las Cruces, Erich Karkoschka of the University of Arizona in

Tucson and Scott Murrell, retired from New Mexico State, tracked the progression of the eclipses over a 2-hour period. The astronomers, along with New Mexico State's Amy Simon, who provided calibration data, released the images on Jan. 30. —R.C.



When shadows meet: This image of Jupiter, taken Nov. 10, 1997, shows shadows (left to right) cast by its moons Io, Ganymede, and Callisto.

Rethinking mental disorder rates

There's a bull market in official estimates of the prevalence of mental and addictive disorders in the United States. A national survey conducted in the 1990s found that nearly 30 percent of adults met the criteria for at least one such ailment in the preceding year and almost half had experienced a mental malady at some time in their lives (SN: 1/22/94, p. 55). A comparable survey in the 1980s reported considerably smaller, though substantial, figures.

The swelling rates stem far more from changes in diagnostic criteria than from a widening epidemic of mental illness, contends a group of researchers in the February ARCHIVES OF GENERAL PSYCHIATRY. Moreover, they argue, many folks meet the psychiatric definition of some disorder but may neither experience serious impairments in their daily lives nor need mental health treatment.

Coauthors of the new article include psychiatrist Darrel A. Regier of the National Institute of Mental Health in Bethesda, Md., who directed the earlier U.S. survey of mental disorders, and sociologist Ronald C. Kessler of Harvard Medical School in Boston, who headed the most recent survey.

The hefty prevalence rates reported in the latter survey reflect its reliance on a revised manual of psychiatric diagnoses that expanded the definition of some conditions, such as anxiety disorders, Regier and his colleagues note.

Many survey participants diagnosed with mental conditions, particularly mood and anxiety disorders, had probably suffered temporary psychological setbacks due to stressful events, the scientists add. Future community surveys are needed to assess the extent of impairment and disability in the daily lives of those assigned a mental disease diagnosis, they say.

There is a growing debate concerning the value of using strict sets of symptoms to distinguish psychiatric disorders from mental health (SN: 2/14/98, p. 100). —B.B.

Family shroud for the mentally ill

Definitions of psychiatric disorders may incite controversy, but mental health researchers and practitioners agree that people who receive treatment for mental illness often encounter rejection and condescension from others who learn of it.

The stigma extends to the families of discharged psychiatric patients as well. About half of the parents and spouses of people recently hospitalized for severe mental ailments try in some way to conceal the hospitalization from close friends, neighbors, and others, according to a study in the current SCHIZOPHRENIA BULLETIN (vol. 24, no. 1).

Epidemiologist Jo C. Phelan of the Columbia University School of Public Health and her coworkers interviewed 156 parents and spouses of individuals who had been discharged 6 months previously from any of 10 suburban New York psychiatric facilities. In each case, treatment involved an initial bout of psychosis, which includes delusions and hallucinations.

Family members concealed a mental illness most often if they did not live with the ill relative, if the relative was female, and if the relative had less severe symptoms that did not recur after discharge. It may simply be harder to hide the condition of an ill relative who lives at home and continues to exhibit signs of psychosis, the scientists say.

Concealment was also more common among family members with at least some college education and a white-collar job than those with no college and a blue-collar job. In an apparent contradiction, earlier studies have found more tolerance toward mental illness in affluent communities.

"This raises the question of whether highly educated people really have more enlightened attitudes toward mental illness or whether they are merely more likely to express socially acceptable views," the investigators note. —B.B.