Behavior

Bruce Bower reports from Washington, D.C., at the annual meeting of the American Psychiatric Association

'Betablocking' autistics' aggression

Antihypertensive "betablocker" drugs, which interfere with nervous stimulation of specific receptors in the heart, recently have been found to ease aggressive and impulsive behavior in some cases of schizophrenia, brain damage and severe mental retardation. Researchers at the Massachusetts Mental Health Center in Boston now report that a small group of adult autistics have shown moderate to marked drops in similar behavior, such as head-banging and unprovoked attacks on others, thanks to betablocker treatment. Furthermore, according to psychiatrist John J. Ratey and his colleagues, the seven men and one woman receiving the medication showed more responsiveness to others and a gradually increasing flexibility in trying new activities and learning new skills.

Subjects were recruited from three Boston-area hospitals, where they displayed severe behavior problems. A betablocker, usually propranolol, was prescribed at a low dose; the dosage was raised every one or two weeks if problems continued and if pulse and blood pressure remained in the normal range. Treatment lasted an average of 14 months, but hospital staff and autistics' families usually noticed a dampening of aggression and increased friendliness within a few months. Fear and panic in social situations and repetitive rituals declined over the course of treatment. This made it possible to reduce or stop neuroleptic drug use for five subjects; neuroleptic medication is often used in an attempt to control aggressive behavior among autistics, says Ratey, but it can lead to movement disorders (SN: 7/20/85, p. 45) that promote impulsive behavior.

Betablockers, speculate the scientists, have a soothing effect on an autistic's constant state of "hyperarousal." Repetitive rituals and social withdrawal are, in part, attempts to keep this arousal under control, they explain, but outbursts can occur with social demands or changes in surroundings. The root causes of autism, however, are not known.

Teen suicide attempts: Rate increase?

In the past few years, considerable attention has focused on what appears to be an increasing number of teenage suicides. A survey of 2,631 adolescents (ages 12 to 18) randomly selected from public and private schools in a large Michigan county indicates that the rate of teenage suicide *attempts* is also a cause for concern.

Nearly 8 percent of the anonymously questioned sample said they had attempted suicide at least once in the previous year, reports sociologist R. John Kinkel of the University of Michigan-Flint. This is a higher and more accurate rate of attempted suicide among teens than previous estimates based on public records and household surveys, according to Kinkel and his co-workers. The highest rates of reported suicide attempts occurred among youngsters living in rural areas (16 percent), those between the ages of 14 and 16 (10 percent) and females (9.9 percent). Females who reported heavy use of alcohol or marijuana were much more likely to report suicide attempts, says Kinkel; this association did not hold for males.

An anonymous self-report survey of 385 students at a high school for the academically gifted in New York City finds that 9 percent said they had made at least one suicide attempt at some time in their lives, according to psychologist Jill M. Harkavy. The students were between 14 and 18 years old. Harkavy and her colleague Gregory M. Asnis, both of Montefiore Medical Center in New York City, also observed that two-thirds of the suicide attempters reported making at least two attempts.

Self reports are not infallible, and the Michigan and New York investigators acknowledge that some students may have considered suicidal gestures or threats to be actual attempts.

Earth Sciences

Stefi Weisburd reports from Baltimore at the spring meeting of the American Geophysical Union

Mysterious clouds caused by cosmoids?

Noctilucent clouds have puzzled and awed cloud watchers since they were discovered a century ago. These clouds, which are seen from the ground in summer after sunset or before sunrise at high latitudes, are unusual because they form in the mesopause, at altitudes of 80 kilometers or more – far above where scientists expect water vapor and other cloud material from the earth to be able to reach. Theories have been proposed to explain the origin of noctilucent clouds, but none is wholely consistent with observations.

Now Maurice Dubin, a physicist at NASA Goddard Space Flight Center in Greenbelt, Md., thinks he has found the solution. He suggests that "cosmoids," or cosmic meteoroids, breaking up near the earth bring from space both the dust and water needed to form the clouds.

Scientists had concluded previously that noctilucent dust has a cosmic origin. But their theories also assumed that the water that condenses on the dust comes from the earth. According to Dubin, this presents a number of problems. The theories predict, for example, times for condensation that are much longer than the observed times for the formation and evolution of the clouds. Moreover, the theories require that the mesopause be cold enough for condensation to occur. And while, in the presence of noctilucent clouds, temperatures in the polar mesopause do indeed get down to −260° F – the lowest atmospheric temperature recorded – clouds have also been observed by Soviet cosmonauts over the equator, where mesopause temperatures are too warm for condensation.

In Dubin's model, extremely cold and icy cosmoids approach the dark side of the earth, become electrically charged and disintegrate into a stream of small particles, which are funneled by the geomagnetic field into a polar region. Clouds could also form, although for much shorter periods, at equatorial regions if the rate of incoming cosmoids is great enough. The cosmoid idea may also explain why the polar mesopause gets so cold. Dubin thinks that the cosmoids themselves quickly cool the atmosphere as they vaporize.

Could crustal strain form 'Texachusetts'?

The theory of plate tectonics holds that the earth's outer shell is composed of a dozen or so floating pieces that spread away from and grind into one another as new plate material is created and destroyed. In the last few years, geodesists, using a technique called Very Long Baseline Interferometry (VLBI), have been able to detect these motions directly by comparing the arrival times of quasar radio signals on opposite sides of plate boundaries (SN: 12/21 & 29/85, p. 388).

Now two scientists argue that measurements indicate that VLBI stations at Westford, Mass., and Fort Davis, Texas – two points on the *same* plate – are converging at about 1.2 centimeters per year. Steven A. Musman of the National Geodetic Survey in Rockville, Md., and Tom Schmitt of the Georgia Geological Survey in Atlanta propose that this compression is responsible for earthquakes in the eastern United States.

While some scientists suggest the apparent convergence of two regions within one plate is due to systematic errors, Schmitt thinks the movement is real. "If so," he says, "it makes a lot of sense from a geophysics point of view." Musman and Schmitt have shown that the measured strain rate is consistent with values, obtained by other methods, for the viscosity of the crust and for the depth at which rocks deform rather than break from tectonic stresses. They also found that the amount of energy being stored by the compression is more than adequate to produce eastern U.S. quakes. The VLBI measurements, says Schmitt, do not indicate where or how often quakes will occur, but they do help seismicity modelers make more intelligent guesses.