Behavior

Preschoolers' stressful trade-off

Moving from one school to another can be stressful for many youngsters. It may also create problems for the classmates departing children leave behind.

Tiffany Field, a psychologist at the University of Miami (Fla.) Medical School, directed a two-week study of 28 preschool children, half of whom then transferred to a new school. Compared with observations made three months earlier during free play sessions, the children who were leaving showed increases in fantasy play, affectionate and aggressive contact, teasing and tattling, sad and angry expressions, fussiness, activity level and heart rate. Two weeks after their departure, the "agitated" behavior of these children had largely disappeared, according to parents' reports. But at that point, the children who remained at the original school began to display similar types of agitated behavior at home and in class.

The children who moved to a new school probably experienced an "anticipatory anxiety" associated with the change, explains Field. The children left behind may not have been affected until they were struck by changes in the classroom group and constant reminders at school of departed friends.

The study is limited by a small sample, notes Field in the September DEVELOPMENTAL PSYCHOLOGY. Future work should compare the reactions of a leaving child with his or her best friend, she says, and also monitor peer separations that are common to all children, such as going on vacation. She concludes, however, that behavioral and physiological changes often occur among preschoolers who transfer to new schools as well as among the friends they leave behind.

Redesigning mental health care

The American Psychiatric Association reports that tens of thousands, perhaps even millions, of mentally ill patients are wandering the streets without treatment after having been discharged from state hospitals over the past 30 years. Many patients have benefited from a return to family and community, say the psychiatrists, but a "revamping of the mental health system" is needed to provide care for the homeless mentally ill.

The report provides no specific "revamping" formula, but two psychiatrists at the Massachusetts Mental Health Center in Boston now say that a new class of treatment facilities would best serve some former state-hospital patients.

Jon E. Gudeman and Miles F. Shore report in the Sept. 27 NEW ENGLAND JOURNAL OF MEDICINE that there are an estimated 15 persons per 100,000 population who cannot be cared for in community programs meant to replace state hospitals. In a review of patients at their hospital and in affiliated community settings, they find that 30 patients—6 percent of the total—require special care not currently available.

Gudeman and Shore divide "special care" patients into five groups: psychotic, medically ill elderly persons who need nursing care; mentally ill retarded persons who require education and behavior therapy; brain damaged, assaultive persons who can be treated in residential units; psychotic, assaultive persons who require secure "hospital-like" care; and disruptive psychotic persons who need a structured living facility.

A 25- to 30-patient unit for each of the five groups could be set up on the grounds of state hospitals, schools for the retarded, nursing homes and in vacant sections of general hospitals, suggest the psychiatrists. A few pilot programs should be tried, they add, to determine what the units will cost and how funding might be attracted.

The movement to get patients out of state hospitals is not a failure, conclude Gudeman and Shore. They estimate that in Massachusetts only about 5 percent of former state-hospital patients, a total of from 800 to 1,000 persons, need long-term specialized care.

Earth Sciences

Plant life after the extinctions

Scientists comparing the layers of rock above and below the Cretaceous-Tertiary boundary in the western United States have unfurled a scenario of the flourishing regrowth of plant life after a dramatic devastation 65 million years ago. It was at this boundary that anomalously high levels of iridium, an element rare on earth but abundant in asteroids and comets, were found (SN: 3/31/84, p. 197). Similar findings in marine rocks elsewhere have led researchers to postulate that the sudden extinction of 75 percent of the species on earth at the end of the Cretaceous era was caused by a collision with a meteorite (SN: 10/9/82, p. 231). Whatever the cause of the catastrophe, the recent work shows that the reemergence of vegetation was rapid.

Robert Tschudy of the U.S. Geological Survey in Denver, Charles Orth of Los Alamos (N.M.) National Laboratory and their co-workers have described the content of each rock layer at sites in the Raton Basin in New Mexico and at Hell Creek, Mont. Starting with the layers lying under the boundary, the researchers found coal-streaked shale containing many fossil pollens and spores. From this geological record, they paint a picture of a dense swamp and rain forest covered by a wide variety of flowering plants and ferns. Then something disastrous happened, and the boundary was formed. At this layer, which the scientists can now pinpoint to within a fraction of a centimeter, the fossils of many spores and pollens abruptly disappear, and the iridium content soars. In the dark coal layers deposited after the event, the researchers discovered flecks of charcoal-like woody tissue, hinting at the presence of a sweeping forest fire.

But then the plants came back. First to recolonize were windborne fern spores, which account for most of the fossils just above the boundary (below, the ferns had represented less than 25 percent of the plant fossils found). On top of that layer, up to 15 centimeters above the boundary, flowering plants once again came to dominate. This resurgence corresponds to 100 to 1,000 years after the event, Tschudy's group estimates. "That's a very rapid recovery in geologic terms," he says.

The tapestry of this floral regrowth, the researchers note in the Sept. 7 SCIENCE, differs markedly from that of the preceding plant life in the Cretaceous. Some species became extinct, leaving ecological voids to be filled by new or surviving plants, whose Cretaceous ancestors may have been part of scattered oases that somehow were protected during the catastrophe, Tschudy believes. The return of vegetation 65 million years ago, the researchers conclude, parallels that which occurred around the volcano Krakatau after it erupted in 1883.

Nagasaki: Soil plutonium sinks

On Aug. 9, 1945, the "Fatman" plutonium bomb was exploded 500 meters above the city of Nagasaki in Japan. Half an hour after the detonation, the fallout, containing plutonium and fission products, reached the ground. The bulk of the radioactive debris was carried by the wind to a suburb called Nishiyama, 3 kilometers from the explosion site.

Since then scientists have periodically measured the amount of plutonium remaining in the top layers of the Nishiyama soil. Recently, two Japanese researchers dug even deeper in order to estimate how far and fast the plutonium has moved.

Yasunori Mahara of the Electric Power Industry and Shojiro Miyahara of Nagasaki University in Japan collected clay and silt samples in 1981, 36 years after the explosion. They report in the Sept. 10 JOURNAL OF GEOPHYSICAL RESEARCH that 97 percent of the residual plutonium was retained to a depth of 0.30 meters, with the rest dispersed to 2.25 meters. From this they estimate a mean migration of 1.25 millimeters per year. The researchers also found highly contaminated soil near the Nishiyama reservoir, containing 55.50 Becquerel per kilogram, a radioactivity level that is almost 30 times higher than the average for Japan.