

DATA POINTS:
CONJOINED

The successful separations last October of two sets of twins joined at the head (one in Dallas and one in Rome) belie the long-standing surgical challenge. The earliest recorded separation traces to Constantinople circa A.D. 945, when doctors attempted to save the life of one Armenian twin after his brother, to whom he was joined at the abdomen, died. (After separation, the living twin died after only three days.) Most conjoined twins don't survive past their first day after birth. —*JR Minkel*

Recorded number of conjoined twins, to November 2003: **1,279**

Conjoined twins per 100,000 births: **1 to 2**

Per 200 identical twins: **1**

Percent stillborn: **40 to 60**

Percent surviving one day: **35**

Ratio of female to male survivors: **3:1**

Percent of conjoined twins joined at the:

Side: **28**

Front of the chest: **19**

Navel: **18**

Hip, spine or sacrum (rump): **19**

Head: **16**

Number of recorded separation attempts: **245**

Percent success rate when twins were joined at the:

Navel: **82**

Hip: **63**

Sacrum: **68**

Number of attempts to separate twins joined at the crown: **33**

Individual survivors: **34**

SOURCES: *www.twinstuff.com*; Jonathan Muraskas, *Loyola University*; *Entwined Lives: Twins and What They Tell Us about Human Behavior*, by Nancy L. Segal (Plume, 2000); *Conjoined Twins: Developmental Malformations and Clinical Implications*, edited by Rowena Spencer (Johns Hopkins University Press, 2003).

MEDICINE

Gut Feeling

Hypnosis is commonly thought of as a parlor trick, but it has some uses in treating medical conditions. One such sickness is irritable bowel syndrome. The ailment troubles up to 58 million Americans, causing abdominal pain, bloating, constipation and diarrhea. Special diets and drug therapies often fail to work well. Nearly 20 years ago researchers first tried hypnotherapy for the disorder. More recently, British researchers followed 204 patients for up to six years and found that 12 weekly one-hour hypnotherapy sessions significantly improved symptoms 71 percent of the time. Of these, 81 percent maintained gains for years after stopping hypnosis. These patients also said they took fewer drugs and saw doctors less frequently. Although hypnotherapy can be expensive, the investigators suggest the long-term benefits offset the cost. Fewer than one in 10 patients attempted alternatives after completing hypnotherapy. The findings appear in the October issue of the journal *Gut*.

—*Charles Choi*



YOU'RE FEELING ... BETTER: Hypnotherapy could produce long-lasting benefits.

BIOLOGY

Holding in Suspense

Suspended animation sounds like science fiction, but recently biologists uncovered genetic mechanisms that actively coordinate this process—at least for an oxygen-starved *Caenorhabditis elegans* worm. The scientists used a technique called RNA interference to disrupt the activity of specific genes. When *C. elegans* embryos lacked a functional copy of the gene *san-1* or *mdf-2*, they were more likely to succumb to a lack of oxygen than their normal peers, which can maintain suspension for days. These genes are key to coordinating the

motions of cell contents during cell division. When oxygen-starved, embryos with knocked-out *san-1* or *mdf-2* failed to sort chromosomes properly as they grew. The researchers note that these kinds of genes are highly conserved, indicating that a code for suspended animation could be found throughout the animal kingdom. Indeed, invertebrates, fish and mammals can at times enter suspended animation to survive extreme oxygen deprivation. The study is discussed in the November 7 *Science*.

—*Charles Choi*

PHYSICS

Slip and Slide

Negative friction, which would cause molecules sliding past one another to speed up rather than slow down, might be possible. Behind the theory is the van der Waals force, which normally causes molecules to weakly attract one another. Electrons vibrate, and when close together, they jiggle in sync, thereby generating an electric pull. Negative friction could result from modified jiggling. The effect would take advantage of the Doppler shift, in which each molecule sees its neighbors' electrons vibrating at slightly higher frequencies as the molecules approach and at lower frequencies as they drift apart. Physicist Adam E. Cohen of Stanford University and physical chemist Shaul Mukamel of the University of California at Irvine say it should be possible to change how electrons vibrate (through light or heat, for instance) and to tune the frequencies so that molecules attract one another as they approach but repel as they move apart. The theory will be published in *Physical Review Letters*.



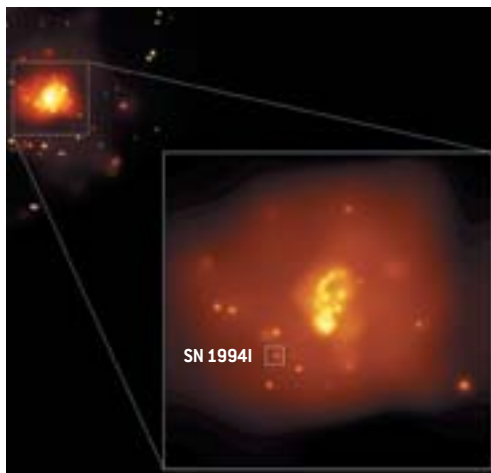
FRICION is inevitable when two objects come together—or maybe not.

—*Charles Choi*

ASTRONOMY

Blasts, Bursts and Flashes

Astronomers long suspected that bursts of gamma rays were related to exploding stars but remained unsure how to categorize the events with respect to other celestial blasts. A gamma-ray burst that reached the earth on March 29, 2003, however, suggests that most such occurrences are produced by the same type of cosmic blast. The burst, the closest ever recorded—at 2.6 billion light-years—enabled astronomers to measure in detail the energy produced. A comparison to previous bursts, x-ray flashes and rare, type Ic supernovae revealed that such events release nearly the same amount of energy (roughly equal to that produced by the sun in its lifetime). Hence, they probably share a common origin, most likely the death of a massive star. Edo Berger of the California Institute of Technology, who studied the burst, says that what differs between the explosions is the “escape route” the energy takes. The research appears in the November 13 *Nature*. —Chris Jozefowicz



WHIRLPOOL GALAXY, seen in x-rays, contains a supernova called SN 1994I. Such rare, type Ic blasts may be at the root of gamma-ray bursts and x-ray flashes.

MATERIALS SCIENCE

A Pulse for Magnetic Memory

The time needed to toggle between magnetic states, which sets the top speed of magnetic memory chips, may have just seen a big improvement. Researchers knew that laser light shining on the ferromagnetic element gadolinium vibrated its atoms and in turn rocked their magnetic spin states relative to one another, but they thought the transmission of energy between vibration and spin had to be messy and random, making memory storage impossible. Now German physicists have observed that chopping the laser light into 30-femtosecond (10^{-15} -second) pulses causes gadolinium atoms and their spins to wobble in lockstep at three terahertz—1,000 times as fast as conventional magnetic memory systems. The scientists speculate that combining pulses may produce magnetic bits suitable for short-lived buffer memory, although incorporating ultrashort laser pulse technology into computers would be tricky, to say the least. The findings were to have appeared in a November issue of *Physical Review Letters*.

—JR Minkel

DETECTORS

Snoop Tube

Existing detectors for pollutants and chemical and biological agents sense only relatively high particle densities. Although vibrating devices can concentrate aerosols into low-pressure nodes, current designs are hard to align and consume lots of power. Now a pipe made



VIBRATIONS trap aerosols along three nodes (white dots).

of piezoelectric crystal has shown it can concentrate particles up to 40 times using a mere 0.1 watt, making it suitable for battery-powered, handheld detectors, according to Los Alamos National Laboratory scientists. They vibrated tubes several inches wide and long in and out (oscillating the tube's diameter) to produce an internal standing pressure wave in which particulates could be trapped. The tube generated three narrow streams aligned with the axis, at airflows of up to 250 liters of air per minute, as reported at a November meeting of the Acoustical Society of America.

—JR Minkel

BRIEF POINTS

- A compound based on a mutant form of the HDL cholesterol molecule found among rural Italian villagers reduced years' worth of plaque buildup in coronary arteries after just five weeks of treatment.

Journal of the American Medical Association, November 5, 2003

- Researchers effectively created the genome of the bacterial virus Phi-X174 from scratch in 14 days. Previous efforts took years, and the resulting synthetic organisms harbored genetic defects.

Proceedings of the National Academy of Sciences USA (in press)

- Lemmings don't follow one another in a suicidal jump into the sea, but they do follow boom-and-bust population cycles—apparently because of a combination of predators (foxes, owls and others), rather than from shortages of food or space.

Science, October 31, 2003

- The shape of beverage containers influences how much people pour and drink. They will pour more into a short, wide glass than into a tall, narrow one, even though they think they do the opposite.

Journal of Consumer Research, December 2003