

RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Gambling on the Increase

Has the proliferation of casinos and state lotteries in North America spawned more addicts? You can bet on it. According to a new analysis of gambling surveys in the United States and Canada, the proportion of "pathological" gamblers in the general adult population has risen about 50% in the past few years.

Since New Hampshire started the first state lottery in 1964, 36 more states have followed suit. That, combined with the opening of casinos on Indian reservations in 26 states since 1988, has boosted the amount wagered annually from \$17.3 billion in 1974 to \$586.5 billion in 1996, according to psychologist Howard Shaffer of Harvard Medi-

cal School and his colleagues.

To try to get a handle on the true prevalence of "disordered" gambling, the authors analyzed data from 120 studies, most of them telephone surveys on gambling behavior, done between 1977 and 1997. They found that the proportion of adults who qualify as pathological gamblers—those whose lives are radically disrupted by out-of-control gambling—has risen substantially, from 0.84% before 1994 to 1.29% since then. Easier access to gambling has not had the same effect on youth, who mostly do "informal" betting, or on prisoners and psychiatric patients, who are much less likely to have been deterred by legal considerations, says Shaffer. He pre-

sented the report last month in Las Vegas at a meeting of the National Center for Responsible Gaming.

There's still very little research on gambling compared to other addictions, the authors say. For example, although surveys indicate gambling problems among about 4% of teens and 5% of college students, there are no longitudinal data to indicate whether today's youths will outgrow their addiction. "We can speculate that they will have higher rates than current adults," says Shaffer's research associate, Matthew N. Hall.

Sociologist Henry LeSieur of Pawtucket, Rhode Island, formerly a professor at Illinois State



'90s gold rush. Casino on Sioux-Dakota Indian reservation in Minnesota.

JEFF GREENBERG/PHOTO RESEARCHERS

University, Normal, says the report may be underestimating problem gambling because it is probably underreported in telephone surveys. And he notes that a major new gambling frontier is just opening up: the Internet. People don't trust the Web with their credit cards now, he says, and it's too slow for real-time poker. But when those kinks are smoothed out, "the problem is going to become even more invisible than it is now."

Prehistoric Artists' Hair

Ever since eye-popping paintings of horses, bulls, reindeer, and bears were discovered on the walls of French caves more than a century ago, archaeologists have speculated about the identity of the primitive artists. Now, some bits of hair may cast light on the mystery.

Archaeologist Robson Bonnichsen, of Oregon State University in Corvallis, and rock art

specialist Jean Clottes, archaeological adviser to the French Ministry of Culture, found individual hairs, human and animal, in sediments of four caves in the Dordogne Valley and near the French Pyrenees last summer.

Although the cave painters did not inhabit the grottoes they adorned—one reason they left so few clues—they sometimes lived in side chambers. Using tech-

niques pioneered by Bonnichsen (*Science*, 5 August 1994, p. 741), the team spent 6 weeks last summer combing cave sediments ranging from 13,500 to 25,000 years old for hairs. Wearing clean suits, masks, hair nets, and gloves to avoid contaminating the site, the team washed the deposits through fine-screen bags, then shipped them to his Oregon lab, where they were sorted

by hand.

The hairs will be dated by a new radiocarbon technique and tested for DNA. "It's astonishing that the hair is there at all," says Clottes. "If we get the DNA, it will be a great breakthrough." Intact DNA from human hair could harbor clues to the pedigree of the enigmatic artists. The types of humans who generated the explosion of art starting some 35,000 years ago has "always been an enormous question," says Bonnichsen. "Were the painters Paleo-Frenchmen or ancestors of the Laplanders or someone else?"

"It's an exciting and tantalizing project," says Meg Conkey, a cave art specialist at the University of California, Berkeley. "If it works, we may finally be able to say something about these [ancient] people and how their populations changed through time."

Some French Rue Street Name

In 1974, Paris renamed a tiny street near the Eiffel Tower after the French-American surgeon Alexis Carrel, winner of the 1912 Nobel Prize for developing new tissue culture methods and techniques for sewing blood vessels together. At the time, no one seemed to care much that Carrel had been a fervent advocate of eugenics and a supporter of the collaborationist Vichy government during World War II.

But now some Parisians have decided they care a lot. Two members of the municipal council, ecologists Sylvie Scherer and Cécile Silhouette, are campaigning to change the name of Rue Alexis-Carrel. So far the city has refused, despite vocal support for the duo's efforts from other scientists and activists. "Even if he did absolutely remarkable things at the beginning of the

century, he also participated in acts that today we consider reprehensible," says Jacques Testart, a human reproduction researcher at the French biomedical agency INSERM.

Paris isn't the first locale to consider severing its nominal ties to Carrel. In recent years, several French cities have stripped his name from street signs, and in 1996, after 4 years of acrimonious debate, the University of Lyons renamed a faculty of medicine dedicated to Carrel.

But Scherer and Silhouette may face an even more arduous task changing minds in Paris. A spokesperson for the city says it is "very unlikely" that the initiative will succeed. "In Paris, we rarely change the name of streets," she says, "because it is too complicated for the post office and the residents."



Alexis Carrel

CORBIS-BETTMAN

Fruit Fly High

Cocaine makes fruit flies behave erratically, in ways eerily similar to its effects in people. The finding suggests that this well-studied, low-maintenance

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organism could prove to be a valuable tool for research on the molecular and genetic basis of drug-induced behavioral changes and addiction, researchers report in the 15 January issue of *Current Biology*.

Research has shown that mice, rats, and monkeys exhibit consistent responses to cocaine: Exposure makes them bob their heads abnormally and become hyperactive. What's more, high doses of cocaine lead to tolerance, where more and more of the drug is needed to produce the same effect; conversely, repeated low doses make organisms more sensitive to the drug's effects.

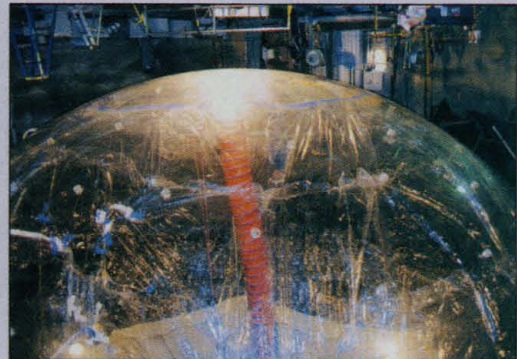
Hoping to find a simpler animal model for the drug's effects, biologists Jay Hirsh and Colleen McClung of the University of Virginia, Charlottesville, exposed *Drosophila melanogaster* to cocaine vapors and videotaped their behavior. Within seconds, the flies started showing signs of being coked up. At lower doses, they stopped flying and began grooming. At higher doses, the flies walked in circles, twirled rapidly, and moved erratically. The highest doses caused trembling and death. Flies that survived exposure reverted to normal behavior within 10 minutes. The researchers also found that intermittent doses made the flies more sensitive to the drug.

Using fruit flies to probe the biological basis of the cocaine experience could be "a very novel and innovative approach," says Jonathan Pollock, extramural program director at the National Institute on Drug Abuse in Rockville, Maryland. Previous work by Hirsh's group with chemicals that mimic dopamine applied to nerve endings in decapitated fruit flies indicates that, as in vertebrates, the neurotransmitter dopamine plays a role in fruit fly response to cocaine. So, says Pollock, researchers should be able to find fruit fly versions of

Fill 'er up. This 12-meter sphere forms the heart of a unique neutrino detector, Canada's Sudbury Neutrino Observatory (SNO), that will be poised to start hunting its quarry after tanking up with \$300 million worth of heavy water beginning next month.

Neutrino detectors are designed to spot the elusive particles produced by nuclear reactions in the sun and other stars. Such spheres are commonly filled with ordinary water, but the SNO detector—which rests in a nickel mine 2 kilometers underground—will contain heavy water, in which hydrogen atoms are replaced by deuterium. Heavy water interacts not just with solar-generated electron neutrinos but also with the other two "flavors," muon and tau. That means SNO will be able to tell if solar neutrinos have "oscillated," or transformed into other flavors, on their journey to Earth.

Oscillation could explain why other detectors see only about half the expected number of neutrinos streaming from the sun. And because oscillation is associated with having mass, it would also indicate that neutrinos are not massless, as assumed in the Standard Model. SNO is "the kind of experiment that comes along once every decade or so," says John Bahcall of the Institute for Advanced Study in Princeton, New Jersey. "I'm deliriously happy."



vertebrate genes implicated in the behavioral changes associated with cocaine.

Cooperative But Illiterate

There seems to be a disconnect between the producers and the consumers of high school graduates in the United States: Parents, teachers, and students themselves think well of the skills of the average diploma-bearer, but college professors and employers say most kids are ill equipped for jobs or for college.

So says a report, "Reality Check," released earlier this month by Public Agenda, a non-profit group based in New York City, based on a fall telephone survey of 2600 parents, students, teachers, employers, and college professors. It states that "large majorities" of employers and college professors canvassed "give fair or poor ratings to public school graduates for basic math skills, grammar and spelling, and clear writing ability." The only place where today's high school

graduates seem to get high marks is in the "new basic skills"—ability to handle a computer and to work well with others.

The results are in line with a survey by the National Association of Manufacturers (NAM), which found that 88% of manufacturers are having trouble finding enough qualified workers. NAM President Jerry Jasinowski complained earlier this month that the Clinton Administration's plans to put \$28 million into new technical training efforts ignore "the underlying problem of the lack of education of workers."

Math or Mat

The seductive idea that the ancients designed monuments, such as the Parthenon, according to the "golden ratio" of modern math—a ratio said to govern the perfect human form among other things—has been discredited in recent years. Now a mathematician has set out to debunk the notion that patterns adorning ancient Egyptian burial chambers were based on sophisticated mathematical concepts. She argues that certain patterns are merely representations of household objects.

Some scholars have claimed that a repeating pattern of spirals framed by zigzags found on the ceilings of many tombs shows that early Egyptians had a grasp of one modern concept of symmetry: a pattern that repeats itself in an infinite plane. That understanding, the argu-

ment went, enabled them to plan an intricate design for a whole ceiling before building it, rather than doing the job piecemeal.

However, "our obsession with [looking for various types of] symmetry may blind us to asymmetry," argues mathematician Marjorie Senechal of Smith College in Northampton, Massachusetts. Earlier this month, at the annual meeting of the American Mathematical Society in Baltimore, Senechal presented a new interpretation of findings from anthropologist Elizabeth Barber of Occidental College in Los Angeles. In 1991, Barber noticed that the 3500-year-old tomb of an official weaver was decorated with juxtaposed patterns previously unknown to Egyptian art but found on Minoan textiles. She proposed that the ceiling patterns were representations of household mats made of imported Minoan fabric.

Although Barber's purpose was to show a link between Egyptian and Minoan civilizations, Senechal applied the discovery to mathematics. If the Egyptians had not contrived a design to fill an infinite plane, she reasoned, they did not need to know modern symmetry theory.

Ethnomathematician Marcia Ascher of Ithaca College in New York agrees that "you can't impute our way of talking about [symmetry] to other cultures." Nonetheless, she believes such concepts are useful in enriching our understanding of their designs.

DOES A HIGH SCHOOL DIPLOMA MEAN THAT A STUDENT HAS AT LEAST LEARNED THE BASICS?

	Yes	No
Professors	22%	76%
Employers	35%	63%
Parents	62%	32%
Teachers	73%	26%
Students	77%	22%

SOURCE: PUBLIC AGENDA