

The reading man's condom

A study of the readability of instructions accompanying 25 brands of condoms sold in the United States reveals they all require at least a tenth-grade education, and most brands require some college-level reading ability for full comprehension of their instructions. Applying three standard readability formulas to 14 different sets of instructions, Gary A. Richwald and his colleagues at the University of California, Los Angeles, analyzed linguistic characteristics of the text, including word and sentence length and vocabulary difficulty, to calculate the probable difficulty.

Analyses of the condoms' instructions for use, handling and storage showed that at best, the reading skill of a college freshman would be necessary to comprehend two of the texts, and six others require the skill of a high school graduate. The "worst case" analysis — of the highest scores for each set of instructions — indicated that all texts would require the reading skill of a high school graduate.

"Although little is known about the relationship between the condom user's comprehension of instructions for use and the condom's effectiveness in preventing pregnancy or disease, such a relationship seems reasonable," the scientists say. They further point out that young people as well as those who have failed to complete high school (13 percent of whites, 21 percent of blacks and 42 percent of Hispanics between the ages of 25 and 34) could encounter difficulty with existing texts. Their report appears in the July-August PUBLIC HEALTH REPORTS.

Soccer goal: Reducing injuries

Soccer injuries investigated during a summer soccer camp showed that boys who are skeletally mature (tall) but weak muscularly (as evidenced by their grip strength) seem more prone to injury than their peers. To reduce such injuries, the researchers suggest matching young soccer players according to their muscular development rather than by age.

The incidence of injury was 10.6 per 1,000 hours of soccer for girls and 7.3 per 1,000 hours for boys in the 6-to-17 age group, Douglas D. Backous of the University of Washington School of Medicine in Seattle and his colleagues report in the August AMERICAN JOURNAL OF DISEASES OF CHILDREN. The ankle was most often injured, and 70 percent of all injuries involved the lower extremities; most injuries were not serious.

Chinese test-tube baby born

Mainland China's first test-tube baby was born last March to a 39-year-old rural schoolteacher, according to a report in the recently released March CHINESE MEDICAL JOURNAL.

Research into *in vitro* fertilization began in 1984 at the Third Hospital of the Beijing Medical University, where the baby was born. "Different opinions on whether a country with a population of 1 billion needed to do research into test-tube births kept China from the work until six years after the world's first test-tube baby was born," the report says.

Also from the journal:

- Traditional Chinese medicine is "big business," with almost a quarter of a million households and 6,000 farms growing medicinal plants. China's 570 pharmaceutical plants produce more than 4,000 traditional Chinese medicines.

- Cancer experts favor strict measures, such as yearly increases in the price of cigarettes, to curb smoking. In Shanghai, where smoking "has been entrenched" longer than elsewhere, two-thirds of lung cancer victims are smokers. In the United States, the American Cancer Society estimates that 83 percent of lung cancer deaths in 1988 will be due to cigarettes. China produced 2 million metric tons of tobacco in 1987, compared with U.S. production of 558,000 metric tons, according to the Tobacco Institute in Washington, D.C.

Dam fine physics

Two-neutrino double-beta decay is the rarest radioactive decay process ever observed in nature. Now, physicist Michael K. Moe of the University of California, Irvine, who was the first to obtain direct, laboratory evidence for this process (SN: 9/5/87, p.148), is setting a trap for an even more elusive quarry: neutrinoless double-beta decay. Recently, he received permission from the U.S. Department of the Interior to install his particle-detecting apparatus within one of the tunnels serving the Hoover Dam near Boulder City, Nev. There, about 400 feet of rock will shield the apparatus, which contains a sample of selenium metal, from the effects of cosmic rays, which would otherwise confuse the data collected.

In the two-neutrino decay process, one neutron in the nucleus of the isotope selenium-82 decays into a proton, neutrino and electron (beta particle). The selenium atom fleetingly turns into an atom of bromine-82, which decays almost instantaneously into krypton-82 by converting a second neutron into a proton and releasing a neutrino and beta particle. Selenium-82 has a half-life of 10^{20} years, or 10 billion times the age of the universe, so that even with a sample containing trillions of atoms, researchers would expect to record no more than two or three decay events per week. Moe's apparatus, known as a "projection time chamber," allows him to trace the paths of the two beta particles released during a decay event and to compute their energies. Any missing energy is attributed to the emitted neutrinos, which can't be detected directly.

After more than a year of observing such decays, Moe noticed that a few events seemed to show little or no leftover energy, hinting that no neutrinos were released. The attempt to confirm whether such a neutrinoless decay process actually occurs forced him to seek a more shielded location for his 10-ton apparatus. The Hoover Dam was the closest convenient site he could find. Moe hopes to install his equipment this fall and run the experiment for at least a year.

If he manages to confirm the occurrence of neutrinoless decays, the finding would force scientists to reevaluate current theories about the nature and behavior of subatomic particles. It would mean, for example, that a neutrino and an antineutrino are really the same particle, and that neutrinos have a definite mass. "The search for the two-neutrino mode was a long, hard quest, but it wasn't quite such a long shot," Moe says. "The zero-neutrino mode is a very long shot. The rewards of finding it are very great. The chances of finding it are very slim. The hint is such that I think we'd be foolish not to pursue it and find out whether it's real."

Hopping in the wind

The details of how the wind carries sand from place to place have important consequences for the study of processes such as wind-driven soil erosion, sediment transport on Mars, the formation of sand dunes and the wearing away or polishing of rocks. Various wind-tunnel studies and other investigations over the last few decades have shown that particles the size of typical sand grains travel in the wind principally by hopping, or saltation. The wind whisks these particles into the air, carrying them for a short distance. At the end of a hop, the grains hit the sand bed, rebounding or splashing out other grains to be carried along further by the wind.

In the Aug. 12 SCIENCE, Robert S. Anderson of the University of California, Santa Cruz, and Peter K. Haff of the California Institute of Technology in Pasadena describe computer simulations that closely mimic the behavior of blowing sand. Their analysis shows the effect of saltating grains on wind velocity and demonstrates the importance of splashing in keeping sand grains in the air.