INNOVATIONS

MEDICINAL WEEDS AND DIABETES

Drug companies looking for new treatments often probe deep inside tropical jungles. But the backyard may also be a rich source of medicines. University of Florida anthropologist John Richard Stepp found that many indigenous peoples shun the forest and rely on weeds that grow nearby. Reviewing scientific studies, he learned that only 3% of all plants are weeds, yet weeds such as the Madagascar periwinkle, above, which yielded a leukemia treatment, are the source of 35% of all plant-derived drugs.

COULD A DIABETES DIAGNOSIS BE AS SIMPLE AS A BREATHALYZER TEST? Marking back to a time when doctors were trained to detect diseases by smell, two Mississippi State University researchers have developed a sensor that spots abnormal acetone levels in a person’s breath. Even though the device is still a lab prototype, it is more dependable at diagnosing diabetes in its early stages than most current tests, the researchers say. One day, the technology could be adapted to diagnose other diseases, including the flu and some cancers.

-Sarah R. Shapero

CERAMICS

A FIX FOR OVERHEATED, SAGGING POWER LINES

SUMMERTIME heat waves signal power troubles ahead. One reason utilities often must turn down the juice is that the high-voltage lines get so hot they stretch and sag, risking a short circuit if they touch tree branches or another line. Most such lines have aluminum-wire conductors wrapped around a steel cable for strength. But as more electricity is pumped through a line, the steel core heats up and elongates.

3M has a fix for this: a ceramic cable that sloughs off heat. This aluminum-oxide material should enable power companies to avert brownouts by distributing two or three times as much juice on peak-demand days, says Tracy L. Anderson, a 3M program manager. The new cables are expensive. But a utility could spend even more to string new high-voltage lines to match the same capacity increase. Xcel Energy Inc. may decide in July whether to become the first utility to use the new power lines.

-Michael Arnlt

COLOR WHEEL

FILLING OUT THE RAINBOW ON YOUR TV

IN THEORY, any color can be produced by mixing red, green, and blue. In the practical world of TV, however, there isn’t enough power to generate every color and also make images bright enough to be viewed without turning out the lights. This trade-off ends up putting a crimp on large slices of video spectrum, especially shades of turquoise, deep scarlet, and gold. In fact, today’s TV sets can create only about 55% of all hues the human eye can perceive.

An Israeli startup, Genoa Color Technologies, has found a way to extend that color range to 90%. It uses a special chip containing proprietary algorithms that translate red-green-blue video signals into five primary colors—adding yellow and cyan. Genoa says the chip and other modifications will add no more than 5% to the cost of most TV sets.

Royal Philips Electronics will feature the technology in a rear-projection TV next year. A liquid-crystal display set may arrive in late 2005.

-Catherine Arnlt

TRACKING IONS

THE PATHOLOGY OF PERCOLATING PARTICLES

IN A RANGE of diseases, including cancer, stroke, and heart disease, some of the damage is caused by minuscule ions as they travel through the circuits of pathways of a cell. To construct better experiments for observing the movements of these ions, two researchers at the University of Michigan have developed a mathematical model that can predict the behavior of oddly shaped particles as they flow through porous material.

Previous models for this process, called percolation, could track only similarly shaped particles, such as sticks, circles, or squares. Ann Marie Sastry and Yun-Bo Yi, reporting in the Proceedings of the Royal Society of London, spent five years perfecting a model that can simulate stretched-out elliptical spheres as they pass through fields of complex three-dimensional shapes, such as the simulated neuron in the picture below. The model won’t describe the movement of ions themselves, but it can predict the behavior of nanoscale sensors that might be used to track the paths of the ions.

-Ann Marie Sastry