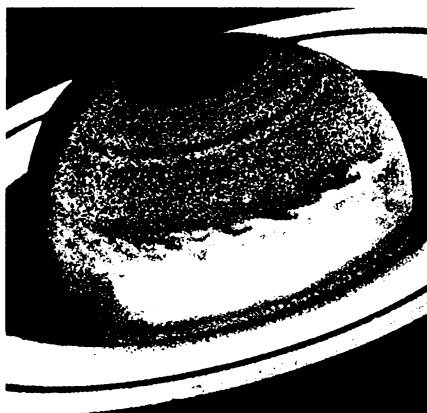


gas expands in the upper atmosphere, fresh crystals of ammonia condense on the cooling vapor, forming the white region visible from Earth.

Observations made during early October 1990—soon after the spot appeared—uphold that idea, the researchers report in the Oct. 3 *NATURE*. For example, the spot remained bright in blue and violet light—even though the old ammonia clouds in Saturn's hazy atmosphere readily absorb these wavelengths. This seems to indicate that the spot sits above the older ammonia clouds, where the theory says such a storm plume should emerge. Observations last November with the Hubble Space Telescope confirm these and other ground-based findings by Sanchez-Lavega's team, says Chris Barnet of NASA's Goddard Space Flight Center. His team will report its findings in an upcoming *ICARUS*.

Sanchez-Lavega's team was the first to link the spot's appearance to Saturn's orbital period around the sun—30 Earth years. Although spots appear alternately over the equator and at higher latitudes, they always form during summer in Saturn's northern hemisphere.

This suggests the sun may drive the formation of Saturn's spots, which typically last several months, the astronomers say. Indeed, they note, the northern summer season comes some 15 Earth years after the equator receives its least sunlight and soon after the sun begins



False-color portrait of great white spot, taken last November by Hubble Space Telescope. Blue denotes low-altitude clouds; higher clouds appear red.

warming the upper atmosphere over the equator. These factors may conspire to create an unusually strong temperature gradient between the upper and lower layers of Saturn's atmosphere at the equator, triggering the sudden updrafts of gas believed responsible for the spots.

If so, Barnet says, spots also should form 30 degrees south of the equator, where computer simulations suggest an even higher temperature gradient occurs. A full test of the theory, however, awaits exploration by spacecraft, since Saturn's rings would block the view of such spots.

— R. Cowen

## Computer model shows tiny drops still drip

Raindrops falling on a waxed car hood bead up and roll away. But should those drops hit a cotton rag used to buff that metal, they flatten and stick, dampening the fabric.

Now two chemists have shown that what people observe in their everyday encounters with water also happens on a molecular scale. Using sophisticated computer software that they developed, Joseph Hautman and Michael L. Klein of the University of Pennsylvania in Philadelphia studied the behavior of water on charged and neutral surfaces. Even when present in small numbers, water molecules on a neutral surface form microscopic droplets that look and act like their much larger counterparts, they report in the Sept. 23 *PHYSICAL REVIEW LETTERS*.

"That's the surprise, the scaling, that it maps so nicely," says Klein. "You need relatively few molecules to produce macroscopic behavior." Raindrops, with more than a quintillion molecules, dwarf the researchers' minuscule computer droplets, which contain fewer than 100 molecules.

For their surfaces, Hautman and Klein simulated long hydrocarbon molecules called alkythiols. In real life, when scientists dip a thin gold-covered plate into a solution of these molecules, the

alkylthiols line up on the plate and "self-assemble" into a single layer that coats the plate. This "monolayer" serves as a surrogate for a simple membrane, says Klein.

For their study, they had the computer model make two kinds of monolayers. They created one monolayer where the molecules align with a charged end sticking out and also a slightly different one with neutral tips facing outward. The scientists then introduced 90 super-cooled water molecules on top of each layer. For the simulation, they heated the wetted monolayer. Then, using graphics software developed by graduate student John Shelley, they watched the reorganization of these computer-generated water molecules on a computer screen.

On the neutral surface, "the [water] droplet arises spontaneously," says Klein. Also, the droplet does more than look like visible drops (SN: 3/16/91, p.165). Scientists often assess the hydrophilic (water-loving) nature of a material by measuring the angle between the surface and the droplet. The more water beads up, the larger this contact angle, and the less wettable the material. Hautman and Klein found that this angle in their simulations also correlated to wettability. Thus, one can use this computer model to predict a

## Alcohol gene: A wider scope

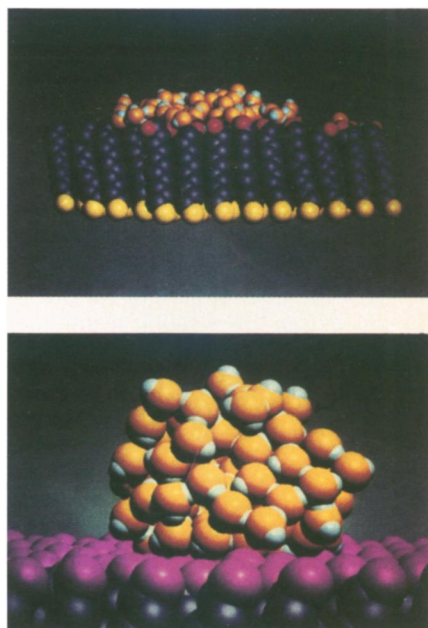
A gene linked to alcoholism apparently does not cause the disorder, but may increase the severity of its symptoms, as well as the symptoms of several other psychiatric and neurological conditions.

The new findings follow several studies suggesting that the same gene—which orchestrates the functioning of brain-cell receptors for the chemical messenger dopamine—intensifies the severity and medical consequences of alcoholism (SN: 9/21/91, p.190).

An increased prevalence of the dopamine receptor gene—ranging from 42 percent to 55 percent—appeared among study participants with alcoholism, autism, hyperactivity, Tourette's syndrome or post-traumatic stress disorder, geneticist David E. Comings of City of Hope National Medical Center in Duarte, Calif., and his colleagues report in the Oct. 2 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*.

The gene did not display an increased prevalence among participants with severe depression, panic attacks, Parkinson's disease or obesity, Comings' group asserts. About one in four healthy controls possessed the gene, they note.

The dopamine receptor gene may worsen symptoms of disorders caused by other genes, the researchers say. □



Computer simulation reveals that even a few water molecules (yellow) flatten out on charged surfaces (top), but form droplets on neutral surfaces (bottom).

Hautman, Klein, Shelley/Univ. of Pennsylvania

new material's hydrophilic properties, says Klein.

This study represented one of the first steps toward developing computer models of membranes and, ultimately, of cells, he adds.

— E. Pennisi