Biomedicine

Who hands down the *Salmonella?*

Jessie Cohen of the National Zoological Park

Remember those pint-sized turtles that proved such popular pets during the 1960s? The U.S. Public Health Service banned them in 1975 after researchers learned that the turtles can transmit *Salmonella* to their human friends. Now a report in the Jan. 24 MORBIDITY AND MORTALITY WEEKLY REPORT suggests that pet iguanas also pose a *Salmonella* threat.

Epidemiologist Daniel Dickinson of the Centers for Disease Control in Atlanta and his colleagues investigated two reports of *Salmonella* illness traced to pet reptiles.

In one case, the investigators learned that a newborn baby developed diarrhea soon after leaving the hospital in August 1990. The baby's stool specimen revealed *Salmonella marina,* a strain of *Salmonella* that rarely infects humans but is commonly found among iguanas. Sure enough, the baby's family had an iguana as a pet, and cultures from the reptile's glass terrarium also yielded *S. marina.*

In the second case, a 3-month-old baby developed diarrhea in November 1990. Once again, specimens taken from the infant and the family's pet iguana revealed *S. marina.*

The investigators say they don't know the exact route of *Salmonella* transmission, but in each case at least one parent cared for both the baby and the reptile. The babies never played with or touched the iguanas, Dickinson notes. However, family members could pass the bug to the infant after touching the iguana or its cage, he adds.

Should families with small infants and a favorite iguana get rid of their pet? "We don't know the answer to that," Dickinson says. However, the researchers do advise family members to wash their hands carefully after handling pet reptiles.

Infections with *S. marina* represent a small fraction of the human cases of *Salmonella*-associated illness. A different strain of *Salmonella,* one that infects chickens and their eggs, remains a more serious public health threat, Dickinson adds.

Working women accrue heart benefits

The hard-driving male executive is often viewed as a prime candidate for a heart attack. But does employment put women in jeopardy of heart disease as well?

A study by a team of German scientists hinted that employment offers women at least one cardiovascular advantage: Higher blood levels of high-density lipoprotein, the so-called good cholesterol that lowers the risk of heart disease (SN: 6/24/89, p.389). Now, Deborah L. Wingard and her colleagues at the University of California, San Diego, report further evidence that employment may provide heart benefits for women.

Wingard's team interviewed 242 women age 40 to 59 about their employment, health habits and marital status. The team also obtained blood samples and measured cholesterol levels. In the February AMERICAN JOURNAL OF PUBLIC HEALTH, the team reports finding that employed women have significantly lower total blood cholesterol values than unemployed women.

The team notes that the working women in their study held mostly administrative or managerial jobs. What underlies the healthful cholesterol values enjoyed by working women? Wingard doesn't know, but she notes that women working at higher-paying, managerial positions may be able to afford better medical care and a better diet. Whether those same on-the-job benefits apply to pink-collar workers, with low-paying clerical positions, remains unknown, she says.

Chemistry

Sparkling buckyball diamonds

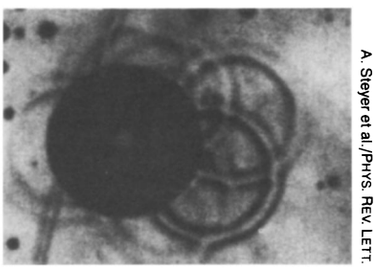
With surprising ease, French and Argentine chemists have crushed the 60-carbon molecules called buckyballs, converting them to diamonds.

Last year, other scientists discovered that a 76-carbon fullerene cousin to buckyballs helped stimulate the deposition of diamond film (SN: 11/16/91, p.310). Now, Manuel Núñez Regueiro of the Atomic Center in Bariloche, Argentina, and two colleagues have discovered that by subjecting fullerene material to a steep gradient of pressure, they can cause the carbon atoms to rearrange into diamonds.

Working at the Very Low Temperature Research Center in Grenoble, France, the researchers filled a 1-millimeter-wide gasket with either a black fullerene or buckyball powder, then squeezed the sample between two diamonds in a device called a diamond anvil. By slanting the anvil slightly, they created a steep gradient across the sample as they increased the pressure 1 gigapascal — 10,000 times atmospheric pressure — per minute. At room temperature and about 20 gigapascals — 200,000 atmospheres — the sample solidified into a transparent disk with an amber or reddish brown color, they reported in the Jan. 16 NATURE. The scientists analyzed these samples using electron diffraction and found that the material consisted of many tiny diamonds.

Graphite also converts to diamond, but that conversion requires higher pressures or temperatures above 1,200 kelvins. It seems that the three-dimensional fullerene transforms more easily than flat graphite, the scientists suggest. Because the buckyball material converted so quickly and completely to a polycrystalline diamond at room temperature, this process may prove useful for making industrial diamonds, they add.

Jumping Droplets



A. Steyer et al./PHYS. REV. LETT.

Ring print of hopped drop

Unusual "jumping" behavior by water droplets has provided French scientists with visual evidence that liquids do put a strain on solid surfaces where the edge of the drop contacts a surface. Physicist Daniel Beysens and two colleagues from the Center for Studies in Saclay, France, showed that drops hop when condensation releases enough heat to overcome the tendency of a surface to hold a drop in place.

Typically, surfaces cling to a drop. But if a wetted surface melts along the edge of the drop, the surface rebounds and pushes on the droplet, causing it to "jump," says Beysens.

For the experiment, the team aimed nitrogen gas saturated with water at an organic film kept almost at its melting point. Through a microscope, the researchers recorded what happened as drops of water condensed on this film.

They observed that droplets seemed to hop a half step at a time, leaving behind a ring print where the film melted. Larger drops paused longer than smaller ones between hops.

Gravity was not the cause. The droplets moved even when the film was vertical or upside down, indicating that the drops didn't leave the surface as they jumped, but rather slid over, the scientists reported in the Jan. 6 PHYSICAL REVIEW LETTERS. Also, defects in the film affected how the drops moved: they tended to hop back and forth between point defects, or in one direction to follow an edge defect.

This phenomenon could have implications for heat and mass transfer, especially for processes that involve the addition of material to a surface one drop at a time, Beysens says.