

# Brave New Biology: Granny Gives Birth

At a time when many of their peers are doting on grandchildren, some women in their 50s dream of delivering an infant of their own. A controversial new study now suggests that for some of these women, that dream can come true.

In a journal article that has stirred a wide range of emotions, a team of scientists led by Mark V. Sauer at the University of Southern California in Los Angeles reports helping fiftysomething women deliver healthy babies. "Women in their 50s are clearly not the same as 35-year-olds. They conjure up images of grandmothers in rocking chairs," Sauer says, adding that this stereotype can be misleading. "The reality is that most women that I see in their 50s are very successful, perhaps at the height of their careers."

Until recently, many older women had given up any hope of becoming pregnant. That barrier began to crumble with Sauer's earlier report that women in their 40s could get pregnant by turning to eggs donated by younger women and a procedure known as IVF, or in vitro fertilization (SN: 9/12/92, p.165).

Now, Sauer and his colleagues have pushed beyond the fortysomething limit. In the first study to focus on women in their 50s, Sauer's team has shown that such women can become pregnant at rates that resemble those seen in a much younger age group. "They did remarkably well," Sauer says. "Implantation and pregnancy rates are as good as the 30-year-old groups that we've done for years."

The team began by recruiting 14 healthy women in their 50s who wanted to have a baby but who had already passed through menopause. The researchers treated the women with sex hormones that prepare the uterus for pregnancy. Next, they collected eggs from younger women. Using standard in vitro techniques, the scientists mixed donor eggs with sperm obtained from each recruit's husband. The team then transferred the embryos from the petri dish to the womb.

Eight of the 14 women became pregnant, the team reports in the Feb. 6 LANCET. One woman suffered a miscarriage in the seventh week of pregnancy, four women have given birth to healthy babies, and the three women still pregnant continue to progress normally.

This reproductive accomplishment is not without critics. While there's no doubt that a baby can bring much joy to an older couple, many aspects of this scientific feat raise serious questions, comments ethicist Ellen Moskowitz of the Hastings Center in Briarcliff Manor, N.Y. Moskowitz wonders whether women who give birth in their 50s will be able to

handle the demands of a teenager.

IVF expert Martin Quigley agrees: "How many 72-year-old women should be raising a teenager?" The rigors of parenting an adolescent aside, Quigley wonders about the motivation of postmenopausal women who want to become pregnant. "Are they trying to recapture their youth?" he asks. Quigley is director of the Northeast Regional Center for Infertility & IVF in Beachwood, Ohio.

Sauer points out that an older woman's reasons for having a child can vary. Some of the women in his study had already had children (and in some cases were grandmothers), but they were in a second marriage and wanted to have a baby with their new partner. In other cases, couples had been married for years, had raised children together, but wanted more kids.

"I would call them professional parents," Sauer says. In still other cases, childless women who had pursued a career wanted one last chance to have a baby, he says. All 14 couples had to undergo extensive psychological testing before they could participate in the study, Sauer adds.

The report raises the specter of ever-older women achieving the goal of pregnancy, a prospect that Moskowitz finds troubling. She points out that older women may die or become disabled while their children are still quite young. Although ethicists have plenty to say about the social issues surrounding the procedure, IVF experts say the new report suggests there's no obvious age limit to such pregnancies. That thought leads Quigley to wonder, "Where will it end?"

— K.A. Fackelmann

## Plants and soils may worsen global warming

Call it the revenge of nature. Two new ecological studies suggest that plants and soils could exacerbate global warming in the next century by releasing vast reserves of carbon dioxide (CO<sub>2</sub>) that they have kept locked away for millennia.

Previous studies of vegetation patterns have indicated the opposite: that plants should eventually ameliorate global warming by growing vigorously and sopping up some of the CO<sub>2</sub> pollution now accumulating in the atmosphere. But such analyses have focused on what happens once the world has warmed, not on the transition period. A simple modeling study now indicates that because plants and soils cannot keep pace with climatic change, they will substantially boost CO<sub>2</sub> concentrations in the atmosphere over the next 50 to 100 years, report Thomas M. Smith and Herman H. Shugart of the University of Virginia in Charlottesville. They detail their findings in the Feb. 11 NATURE.

The CO<sub>2</sub> release forecasted by the two researchers may already have started in the Arctic, according to a separate study reported in the same issue.

To estimate how vegetation and soils will respond to global warming, Smith and Shugart started with general circulation models that simulate how greenhouse gas emissions will alter the climate. By matching climatic patterns with known plant limitations, the researchers produced maps showing the locations of tundra, forests, savannas, and other types of "life zones." They compared a life-zone map for current conditions with a map representing a climate with double the amount of CO<sub>2</sub>. Using crude estimates for how long it takes life zones to replace

each other, the two ecologists calculated how much CO<sub>2</sub> the land surface could store as vegetation patterns shift.

The study shows that transitions that release CO<sub>2</sub> take place much faster than those that store the gas. For instance, forests convert rapidly to grasslands through dieback or fire, which liberates CO<sub>2</sub>. But it takes centuries for CO<sub>2</sub>-storing tundra to replace polar deserts, because species must migrate long distances.

Land changes could boost CO<sub>2</sub> levels by up to a third of the present concentration, the study indicates. While they have little faith in the exact numbers in the study, Smith and Shugart believe their qualitative results have significance because the same conclusions emerge when they use other numbers.

Evidence collected from the tundra of northern Alaska suggests that global warming may already have spurred the land there to start releasing CO<sub>2</sub>, report Walter C. Oechel of San Diego State University and his colleagues.

Oechel's group set up airtight chambers along a 200-mile stretch in northern Alaska to measure gases absorbed and released by growing vegetation and degrading organic matter.

Since the end of the last ice age, the tundra has stored CO<sub>2</sub> by building up thick layers of peat. However, Oechel's measurements in the last decade indicate that tundra along Alaska's North Slope has started to release CO<sub>2</sub> — because microbes are consuming peat faster than it can grow.

Oechel believes the shift happened quite recently. In the early 1970s, measurements made at Barrow showed the tundra absorbing CO<sub>2</sub>. When Oechel and

his colleagues remeasured that site, they found the tundra releasing CO<sub>2</sub>.

Temperatures in northern Alaska have risen in recent decades and may have precipitated the change measured by Oechel by drying the tundra and stimulating microbes in the peat. "I personally feel we're seeing the first effects of greenhouse warming," he says. "But even if that's not the case, it gives us indications of how ecosystems will perform when and if that warming occurs."

If tundra across the Arctic were releasing as much CO<sub>2</sub> as Oechel measured in northern Alaska, it would produce roughly 5 percent of the amount that humans emit through burning coal, gas,

and oil. Oechel plans to make measurements this summer in Russia.

Jonathan T. Overpeck of the National Oceanic and Atmospheric Administration in Boulder, Colo., calls the pair of new studies a one-two punch: "Anyone who is going to say you can't believe the modeling stuff because it's so oversimplified better wake up when they see the numbers coming from the tundra."

Yet some tundra scientists remain unconvinced that the tundra has stopped storing CO<sub>2</sub>. "I wouldn't put any significant money of my own down to say that it has changed much," says Donald Schell of the University of Alaska in Fairbanks.

—R. Monastersky

## Suicide signs loom in pair of surveys

Two new studies provide behavioral clues to the likelihood of attempting or completing suicide among members of two disparate groups: predominantly white, middle-aged nurses and teenagers of both sexes and varied ethnic backgrounds.

Among nurses tracked for 12 years, suicides rose markedly as cigarette smoking increased. And in a large sample of students in public high school, a particularly strong association emerged between thinking about or attempting suicide and committing aggressive acts such as carrying weapons and fighting.

Both studies, and a comment on the findings by psychiatrist David Shaffer of the New York State Psychiatric Institute in New York City, appear in the February AMERICAN JOURNAL OF PUBLIC HEALTH.

No decisive explanation exists for the connection between cigarette smoking and suicide, concludes a scientific team headed by David Hemenway, an epidemiologist at the Harvard School of Public Health in Boston. The researchers consider it unlikely that smoking causes suicide in any direct way. However, they note that smokers suffer increased rates of alcoholism and cancer, both of which boost the risk of carrying out a suicide, according to previous studies.

Independent data indicate that common genetic factors may predispose some people to both cigarette smoking and severe depression; the latter poses a major risk of suicide (SN: 1/30/93, p.71).

Hemenway and his co-workers studied more than 100,000 female registered nurses, age 30 to 55, living in 11 states. Participants completed questionnaires mailed every two years from 1976 to 1988. The researchers obtained death certificates for volunteers who died during the study; these documents provide a conservative estimate of the number who killed themselves.

Compared with those who had never smoked, women who smoked one to 24 cigarettes daily displayed twice the likelihood of committing suicide, and those smoking 25 or more cigarettes daily exhibited four times the likelihood of committing suicide, Hemenway's team contends.

The analysis did not consider other factors linked to suicide, such as alcoholism and depression, but it stands as a rare long-term study of the relation between a specific behavior and subsequent suicide, Shaffer asserts.

The second study, directed by epidemiologist Carol Z. Garrison of the University of South Carolina in Columbia, relied on questionnaires completed by 3,764 students in grades 9 through 12 regarding their behavior in the year prior to the survey. Youngsters attended public

## First direct measure of volcano's blast

Since Japan's Unzen volcano awoke in 1990 from a 200-year repose, lava has oozed from a vent on its eastern slope, forming an unstable dome that looms menacingly over towns below. Periodically, part of the dome shears off or collapses, releasing a cascade of debris with explosive force.

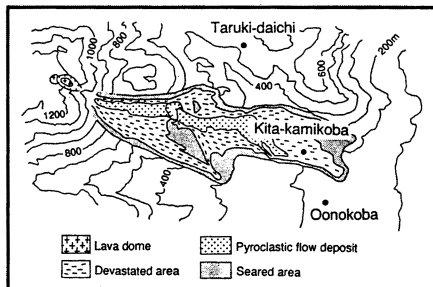
Volcanologists yearn to measure directly the energy released during such volcanic events. But such close-up, detailed observations pose extreme danger, and the fury unleashed by a dome collapse can turn expensive instruments into scorched, shattered hulks.

Now, using a simple, rugged device designed to gauge military munitions and other explosives, Japanese scientists have achieved the first direct measurement of the energy released during a volcanic blowout. Volcanologist Hiroimitsu Taniguchi of the Science Education Institute in Osaka and geologist Keiko Suzuki-Kamata of Kobe University report their findings in the Jan. 22 GEO-PHYSICAL RESEARCH LETTERS.

The researchers measured the shock wave created by a dome collapse on June 8, 1991, and then calculated the pent-up energy required to generate it — the equivalent of about 12,000 tons of TNT. Previously, volcanologists relied on more approximate measurements. In one widely used method, researchers locate a chunk of debris and calculate the energy required to hurl it from the volcano to its landing place.

To make their measurements, Taniguchi and Suzuki-Kamata set up three meters within the volcano's destructive range. The pressure-sensitive part of the meter consists of a hollow chamber about two inches wide, covered with a thin lead plate. The sensor is mounted on a sturdy pole driven into the ground.

The researchers calculated the June 8 shock wave at 75 meters per second at the source on the basis of how severely the wave deformed the lead plate as it passed the meter at Taruki-daichi, a town



Researchers placed meters in three towns near the eastern slope of Unzen to measure directly the energy released by a lava dome collapse.

2,700 meters northeast of the lava dome. That's powerful enough to knock over a person standing in Taruki-daichi, they report.

The new method of measuring may reduce inaccuracies, says Richard B. Waitt, a volcanologist at the U.S. Geological Survey's Cascades Volcano Observatory in Vancouver, Wash. "It's a far more direct means of [making measurements]," he says. "This allows some calculations as to what the volcano is capable of."

Unzen has proved capable of quite a lot. The blast that the Japanese researchers measured came just five days after a massive flow of hot ash and debris from a dome collapse killed 43 people in Kita-kamikoba, a town directly in the firing line of the volcano's east-facing vent.

Direct measurements of volcanic blasts may provide a means of checking the theoretical models some volcanologists have created to explore the physics of crumbling lava domes, says volcanologist Jonathan H. Fink of Arizona State University in Tempe, who helped develop such a mathematical tool.

"It's interesting that the number these [researchers] came up with — 75 meters per second as the maximum velocity — is well within the range that we would calculate based on the model," Fink comments.

—D. Pendick

Taniguchi and Suzuki-Kamata