lasting 11 years. "I've been living this cycle just about from beginning to end, and it's sort of an inspirational experience," says Patrick S. McIntosh of the National Oceanic and Atmospheric Administration's Space Environment Laboratory in Boulder, Colo. The previous two solar cycles, according to McIntosh, appear feeble by comparison. "I've compiled the levels of solar activity since we've been keeping satellite records, and [the present active region, designated AR 5395 and the source of the big flare] is off the top of the scale."

The flare, spotted by an X-ray instrument aboard the Solar Maximum Mission satellite, was "one of the largest X-ray events ever recorded," says Judith J. Nelson of ST Systems Corp. in Lanham, Md. In fact, she adds, it was "the largest ever observed by [Solar Max]." Nelson is in charge of forecasting solar conditions for Solar Max scientists at the NASA Goddard Space Flight Center in Greenbelt, Md.

Richard Schwartz, also of ST Systems, notes that between March 6 and 19 — the time required for the active region to cross the sun — the satellite's Hard X-Ray Burst Spectrometer recorded 447 hard X-ray flares, a rate of about 32 per day. This exceeded the previous high by 50 percent. During one five-day span within that stretch, the instrument detected more than 250 flares, also a record. Schwartz says the active region also produced the most intense "single-spike event" of X-rays ever measured by the device. Furthermore, it identified three flares that were turning out X-rays faster than all but 10 other flares in the history of the satellite's mission, which began in 1979.

Besides the X-rays, Nelson says, radio telescopes observed radio events unprecedented both in intensity and in duration. Moreover, active region 5395 triggered major disturbances of Earth's magnetic field. On March 13, an index of geomagnetic activity known as the AFR reached a level of 248, the highest it had been since Nov. 13, 1960. The effects showed up at an unusually low latitude, where such disturbances are produced only by intense solar activity. Auroras were reported at the time in night skies as far south as the Bahamas, Nelson says.

Ironically, the tumult also hastened the demise of Solar Max, notes Chris St. Cyr at Goddard. The increase in solar activity has heated and thus raised the height of Earth's atmosphere, increasing the drag on the satellite. So during the two weeks when the active region was crossing the sun, the low point of the satellite's altitude dropped about 3 miles, says project scientist Joseph B. Gurman of Goddard. Goddard's Flight Dynamics Branch now predicts Solar Max will be impossible to control from the ground after Aug. 3, and that by Oct. 9 it will reenter the atmosphere and burn up. — *J. Eberhart*

Breast cancer risk linked to dense tissue

Women with a higher percentage of dense breast tissue face a greater risk of developing breast cancer than women with primarily fatty breasts, according to new research presented this week at the American Cancer Society's 31st Science Writers' Seminar held in Irvine, Calif. The research team developed and tested a technique that measures the amount of dense tissue picked up by mammograms, X-ray pictures of the breast.

The method may provide doctors with a simple, accurate way to identify women with a higher-than-average threat of breast cancer, a disease that will strike about 142,000 women in the United States this year.

"We believe that the measurement of percent densities is a promising technique that could enhance the physician's ability to identify high-risk groups of women," says Audrey F. Saftlas, an epidemiologist at the Centers for Disease Control in Atlanta. Saftlas, John N. Wolfe at the Hutzel Hospital in Detroit and colleagues began their work with the theory that cancer occurs more often in women whose breasts contain proportionally more dense-type tissues, such as epithelial and connective tissue, because breast cancers occur most often in these cells.

To test their idea, they studied 567 women enrolled in the Breast Cancer Detection and Demonstration Project, a nationwide, five-year screening program sponsored by the American Cancer Society and the National Cancer Institute. Wolfe used an instrument called a planimeter to determine the percentage of dense tissue highlighted by each woman's initial mammogram. The researchers found that the 266 women diagnosed with breast cancer during the project's fifth year were more likely to have more dense breast tissue than 301 women who showed no signs of breast cancer during the study period.

"We found that breast cancer risk increased steadily with increasing breast density," Saftlas reports. Women whose mammograms showed over 65 percent dense tissue developed breast cancer at a rate more than 400 percent higher than that of women with densities of less than 5 percent. Women with densities of 5 to 25 percent developed the disease at a 70 percent higher rate compared with the same group, Saftlas says.

Women with a family history of breast cancer faced an even greater threat: Those who reported breast cancer in a mother, daughter or sister and who showed mammographic densities of 45 percent or more developed breast cancer at a rate 700 percent higher than that of women with no family history and a mammographic density of less than 5 percent, Saftlas says.

The study is important because doctors need a more accurate method of spotting women at high risk of breast cancer to provide early detection, says Benjamin F. Byrd Jr., clinical professor of surgery at Vanderbilt University in Nashville, Tenn. Still, the new technique's accuracy must be verified, Byrd adds. Saftlas agrees, but expects further research will confirm the new findings. "The percentage of the breast containing mammographic densities is a *bona fide* risk factor for breast cancer that is at least as important as family history," she says.

— *K.A. Fackelmann*

What killed the chickens?

The deaths of 16 embryonic chickens that rode into orbit with the space shuttle Discovery last month have raised questions that could bear on the development of living creatures whose lives begin in reduced gravity, such as aboard a space station. The experiment, devised by John Vellinger, now a student at Purdue University in West Lafayette, Ind., sought to determine whether chickens from eggs that spent five days aboard the shuttle would develop any differently from a control batch of fertilized eggs kept on the ground.

Sixteen eggs were fertilized nine days before Discovery's March 13 launch, and another 16 only two days before the mission began. The older chickens hatched and were still alive and well this week, but half the younger ones were found dead when their eggs were opened just after landing. The rest were placed in an incubator, but they, too, have failed to hatch, says veterinary anatomist Ronald L. Hullinger of Purdue, who is Vellinger's faculty adviser.

"We don't know why the embryos stopped developing," Vellinger says, "but it happened sometime after the launch." According to Hullinger, there is a possibility that one egg the researchers opened early may not have been fertilized. Some of the embryos appeared as though they might have been viable when placed in the incubator, he adds, but additional study will be required to make sure.

Factors that might have played a role in the deaths include how long each egg spent in the hen's reproductive tract and how long after laying each egg was collected. But Hullinger says the effects of reduced gravity in orbit really do seem to be what counted. The embryos that died, he notes, were all in the first trimester of their 21-day development, while the older ones orbited during their second trimester. Future studies, says Hullinger, ought to focus on when the survival difference occurs. □