

Cadle's preliminary results also confirm that the volcano is not producing new magma. Volcanic eruptions are generally of two types: phreatic, in which ground water explodes into steam and forces old rock and ash from the crater, and magmatic, in which fresh lava is released. Recently, however, scientists began to suspect that ground water may have a larger role in magmatic explosions than previously thought. Cadle says. By analyzing such factors as the origin of the water in the eruption cloud and how the water has reacted beneath the surface with certain compounds, Cadle hopes to learn more about the chemistry of the volcano's plumbing. "Since we can't dig away at a volcano like an anthill or something, all we have is circumstantial evidence that ground water is playing a role." Mt. St. Helens, he says, may provide the phreatic extreme in the spectrum of underground volcanic chemistry.

As befits a sultry soap opera star, Mt. St. Helens's recent behavior has been at best contradictory. Despite the apparently foreboding swelling, the volcano has ceased to spew out angry, ash-filled clouds and has settled down to more sedate, near constant steaming. Harmonic tremors, which are long-lasting, rhythmic shakings that herald the movement of magma (SN: 4/12/80, p. 229), have not been recorded since April 12. The daily number of earthquakes has decreased, but the proportion that are larger than Richter magnitude 4.0 has increased. All in all, says a USGS spokesman, "We don't know what it means."

But they like it: As far as science is concerned, the Mt. St. Helens saga is a hit. As many as a dozen scientists are still tuned in to the volcano round the clock, says Tilling, though the viewing is starting to take a toll on the USGS volcano budget. (A request for supplemental funding is in the works.) "This particular eruption is the first in the lower 48 states to be studied with modern instruments and with a staff of people experienced with volcanoes and ready to go," says Tilling. "Even if we don't see magmatic material, we have been able to study the hydrothermal processes, what is driving the eruptions, the natural seismicity, the nature of the fluids. It is a unique opportunity to study the reawakening of a strato-volcano [made of alternating layers of lava and ash]."

In order to make those studies a little easier, 35,000 acres of the Gifford Pinchot National Forest surrounding the volcano have been declared a "geological area" by the Forest Service. The designation allows the Forest Service to take steps to protect the area from encroachment and destruction, says a spokeswoman.

Will Washington State find happiness with Mt. St. Helens? Will the USGS figure out the meaning of the bulge? Will harmonic tremors ever return? Will the volcano ever erupt magma and quit fooling around? And will this story ever end? Stay tuned. □

High skin-cancer rate at government lab

The incidence rate for malignant melanoma — a virulent and sometimes lethal form of skin cancer — is nearly five times higher for white male employees of Lawrence Livermore Laboratory than for either the general population or for individuals living in the communities where the affected employees live. What's responsible for the increase is unknown.

A study done by Donald Austin and colleagues at the State of California's Department of Health Services in Oakland focused on LLL workers after a local hospital noted what seemed to be an abnormally high occurrence of the rare cancer among LLL employees. "Since the non-white population tends to have practically no melanoma," only the white population was examined, explains Mildred Snyder, one of Austin's colleagues. And to control for two factors that have been linked with the disease — a higher incidence in sunny regions and in high socio-economic groups — the study population was matched for age, sex and race against a control group of individuals living in the same counties (Alameda and Contra Costa) as the employees studied.

The finding, Snyder says, is that "the rate of melanoma occurrence was five times higher [actually around 4.75] in the employee group than in the general population." Alternate geographic breakdowns "all came out the same," she adds. And since just two of the 19 cancers found among LLL workers involved women, the elevated risk has been established only for men. At a rate per 100,000, that translates to 57 cases among the employees versus

12 cases among the controls.

"We're planning additional work," Snyder says, "to see if we can pinpoint the hazard in the environment or what in the employee group is different in some way." The epidemiologists will look for things affected individuals had in common such as occupation, work location, previous work history or lifestyle.

Because about half of LLL's research programs involve nuclear weapons design or development, the California researchers add a disclaimer to their findings: "Malignant melanoma has never been associated with any type of radiation other than ultraviolet radiation. In well studied populations having received radiation from medical-, nuclear-fission or radioisotope sources, increased malignant melanoma risk has not been reported." Any other statement "would be conjecture."

But hints that other agents might act synergistically with UV light to promote the cancer have led to studies such as one exploring a possible link between melanoma and oral contraceptives. This study is headed by a group at the University of California at Los Angeles. And a five-year study of Los Angeles County residents by Thomas Mack at the University of Southern California will try to answer perplexing questions such as why persons who work in the sun have a low risk of melanoma; why doctors, lawyers and bankers are at high risk; and why persons born in California are at higher risk than those born elsewhere and now living in California. □

Estrogen therapy and breast cancer

Drugs originally purported to keep women "feminine forever" have in recent years been charged with causing some serious damage. Estrogens, which are administered to relieve uncomfortable symptoms of menopause, appear to be linked with cancer of the uterine lining (SN: 1/3/76, p. 9). Now a study by University of California scientists indicates that long-term estrogen treatment of postmenopausal women also increases the risk of breast cancer.

Women from two retirement communities near Los Angeles were the subject of the study. A group of 131 patients with breast cancer was matched with 262 control subjects of the same age, class, race and marital status.

A 2.5-fold higher than normal risk of breast cancer was calculated for those women using high doses of estrogen, the equivalent of 1.25 mg daily for at least three years. "We were surprised to find that this strong effect appears limited to women with intact ovaries," Ronald K. Ross and colleagues report in the April 25

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. The increase is substantial, biologically credible and consistent with findings of a 1976 National Cancer Institute study (SN: 2/5/77, p. 90), they say. However, they report a risk below what they expected for lower level use of estrogens.

From their data, Ross and co-workers estimate that a woman undergoing menopause at age 50 who receives 1.25 mg replacement estrogen therapy daily for three years increases her probability of getting breast cancer by age 75 from 6 percent to 12 percent.

"These are sizable increases and carry with them sizable differences in mortality," Ross and colleagues say. "The benefits of estrogen therapy at this dosage level would need to be extremely great to warrant such risk."

In an accompanying editorial, Paul Meier and Richard L. Landau of the University of Chicago criticize the California findings. They point out that a similar 1977 study found no excess risk. In addition they say the high amount of estrogens that

resulted in increased risk in the recent study is "at least twice that presently prescribed by many thoughtful physicians."

Meier and Landau propose that only a controlled, prospective clinical trial — comparing for 10 or 15 years women who choose to use postmenopausal estrogen therapy with similarly affected women who decline it — would satisfactorily determine whether estrogens increase breast cancer risk.

"Although the expected latency ... makes for a long wait to get clear answers, it is unlikely that the problem will disappear in the absence of convincing studies," they insist. □

Drug slowdown seen among high schoolers

Marijuana blossomed in the 1970s, with increasing numbers of the younger generation picking pot as their recreational drug of choice. But now the illicit weed may be losing its allure, according to researchers at the University of Michigan's Institute for Social Research. Lloyd Johnston, Jerald Bachman and Patric O'Malley report that the majority of young persons in the United States are becoming more conservative about most kinds of drug use.

Every year since 1975 the ISR researchers have surveyed 17,000 high school seniors nationwide. Between 1975 and 1978 they found increasing numbers of seniors using marijuana but, they say, "that trend halted after 1977 ... and attitudes toward regular marijuana use have actually hardened since then." Almost 70 percent in the recent survey said they disapproved of regular marijuana use, and 34 percent disapproved of trying the drug even once or twice. More than 90 percent disapproved of regular use of cocaine, heroin, LSD, amphetamines or barbiturates.

The researchers credit media coverage of potential marijuana hazards with bringing about more conservative attitudes and say, "these shifts, though rather modest to date, could prove important to the health of the American population 30 or 40 years hence, particularly if the downward trend continues." □

Anturane use delayed

The Food and Drug Administration last week refused to allow the Ciba-Geigy Corp. to label or advertise Anturane, a prescription drug for gout, for the prevention of death in the months after a heart attack. Recent studies claimed the drug reduced such deaths by 74 percent (SN: 2/9/80, p. 86), but the FDA found that many of the deaths were "misclassified or vaguely defined" and the study did not offer "the quality of ... evidence [required] to approve the drug for this use." □

Saturn's rings: A scene unseen



Picture of Saturn's rings as they might appear from "on top" (above) was made using radial ring-brightness measurements from Pioneer 11 photos (left). Newly found "F ring" is outermost thin arc. Disk of Saturn itself is separately added Pioneer photo of planet's cloud tops.

When the Pioneer 11 spacecraft flew past Saturn last September, it provided a view of the planet's spectacular rings as earthlings have essentially never seen them. The vehicle's trajectory enabled it to look at the "surface" of the rings that is tilted away from the sun, rather than only at the sun-facing side generally visible from earth. The results were strange indeed: Some areas that appear dark when viewed from the sunlit side because they contain relatively few particles looked bright in the spacecraft's images, because of light-scattering by those same few particles. Regions that appear bright on their sun-facing sides, on the other hand, looked more or less dark, depending upon the amount of sunlight that was blocked by their more densely arrayed particles.

Now information from two of those images has been used to show the rings as they might appear from yet another point of view—one that not even Pioneer 11 ever had, nor will either of the Voyager spacecraft now en route to their own close encounters with Saturn this November and in August of 1981. John Fountain of the University of Arizona, together with some of his colleagues, has used a computer to expand some of the Pioneer data into an image of the rings as they might look from directly overhead, as if they had been pho-

tographed by a spacecraft one million kilometers above Saturn's north pole.

This never-seen view of the rings is not a photograph, nor is it even a photo whose individual elements, or "pixels," have been reorganized by the computer to show the scene from a different angle. (Such a technique is possible in some cases, however. The Viking orbiter photos of Mars, for example, can be computer-manipulated into spherical projections centered at any point on the planet, as well as into mercator, stereographic and other projections.) Instead, the researchers used the Pioneer 11 photos merely as a guide to the rings' pattern of brightness and darkness with increasing distance from Saturn; in essence, they measured the changing brightness along a single radial line through the rings. The computer then swung the line around as though it were pivoted at the center of Saturn, producing the image shown above. The brightness pattern, like that in the photos, is that of the "surface" facing away from the sun, as if the sun's light were coming in at 2° below the ring plane and being reflected up at a 90° angle to the spacecraft. The actual appearance from this angle might be somewhat different, since the data were taken from photos in which the light was reaching Pioneer 11 at an angle of only 6° to the ring plane, but the contrast with sunlit-side photos ought to be similar. □