

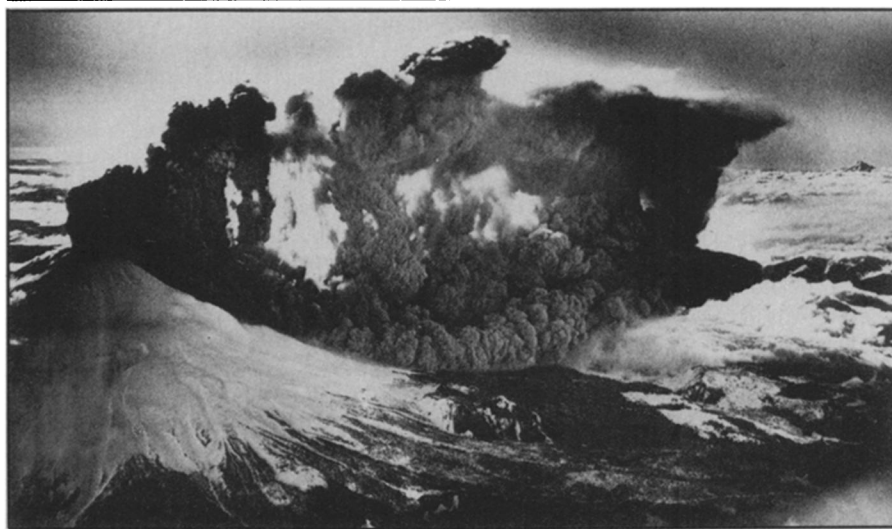
An injectable contraceptive is another project receiving much attention at Alza and elsewhere. The Alza scientists have developed a system in which the contraceptive drug is bound within a matrix of a hydrophobic material, a polyorthoester. As the surface of the matrix erodes, the hormone is gradually released. In the first clinical trials, among women in Sweden, one administration provided a constant level of the contraceptive hormone for six months.

Another approach to long-term contraception was presented by Gopi N. Gupta of Cornell University Medical College. Gupta and colleagues have developed a rice-size pellet containing 85 percent contraceptive hormone and 15 percent cholesterol, consolidated by a heat fusion technique. In monkeys, pellets under the skin gave a burst of drug and then a steady rate for three months. Gupta says that this method, similar to one used for delivering hormones for other treatments, has the advantage that the pellet dissolves completely into the hormone and a natural body component, cholesterol. Using the subcutaneous pellet, the effective daily dose of hormone is only one-tenth that of conventional oral contraceptives.

Biodegradable implants for a variety of drugs are the goal of scientists at Arthur D. Little, Inc. in Cambridge, Mass. Kenneth R. Sidman reports success with a small drug depot made of copolymers of L-glutamic acid, a naturally occurring amino acid. After the drug is released, the depot disintegrates into the amino acid and is metabolized completely. Sidman says these polymers can release a wide range of drugs. He is currently developing a pellet that releases a contraceptive for about a year after implantation. Other scientists are working on a depot for releasing a narcotic antagonist for use in anti drug abuse programs. Another team is using the pellets to provide a growth stimulant for livestock. Sidman predicts that clinical trials of a number of L-glutamic acid copolymer depots will begin within five years.

Even newer approaches to drug delivery are being investigated by Robert Langer of the Massachusetts Institute of Technology. All drug-plastic implants so far developed can only deliver drugs at constant or decreasing rates, Langer says. He recently has begun exploring a system that can release drugs at increased rates on demand. He adds small magnetic beads to the plastic of an implant and finds that a magnetic field can boost drug release by a factor of three. Langer suspects the magnetic field causes a "squeezing" of channels in the plastic, forcing out more drug. Such controlled release could be useful in cases in which increased drug release from an implant was desired during specific parts of the day or, for contraception, during specific periods of the menstrual cycle. □

Mt. St. Helens comes to life



Sunday morning surprise: Mt. St. Helens sends up a cloud of smoke and ash.

Stretching from northern California through Oregon and Washington, up into southern Canada, the Cascade mountain range forms a bony spine along the western edge of the United States. Hikers, mountaineers and weekend vacationers are fondly familiar with the names Mts. Lassen, Shasta and Jefferson; the Three Sisters, Mt. St. Helens, Mt. Hood; Mts. Adams, Baker and Rainier, and, of course, Crater Lake. But most of the hikers tend to forget that these mountains are actually volcanoes, and that any of them could erupt at any time.

Last week "could" became "is" and many weekend mountain climbers turned into weekend geologists. The real geologists found themselves with a live volcano, the first in the continental United States to erupt since Mount Lassen in northern California dirtied up the surrounding countryside in 1915. Mt. St. Helens, the 9,677 ft. volcano in southwestern Washington State, has become active again.

Mt. St. Helens is 50 miles northeast of Portland, Ore., and only 30 miles due east of the Trojan nuclear power plant. It is a typical composite volcano — made of alternating layers of ash flows and lava — and has been compared in beauty to Mt. Fuji in Japan. It is one of the youngest of the Cascade volcanoes and the most active. In the last 500 years alone the mountain has erupted on an average of once every 100 years. The last episode began in the 1830s and continued sporadically — and sometimes spectacularly — until 1857.

The latest episode began March 20, when seismologists at the University of Washington in Seattle detected swarms of microquakes centered under the mountain. The frequency and intensity of the quakes increased over the next five days until by March 25 the seismometer near the volcano was saturated with quakes. Between 4 p.m. and 10 p.m. that evening,

reported U.S. Geological Survey seismologist Craig Weaver, "We had 23 quakes larger than magnitude 4 on the Richter scale, an average of 4 per hour."

From that maximum, the earthquakes diminished in intensity if not frequency through March 26, and by that evening the number of quakes had dropped. Scientists, however, were not writing Mt. St. Helens off yet. A reduction in earthquakes often immediately precedes a volcanic eruption, and there was no reason that it couldn't be the case here.

Volcanologists didn't have to wait long to find out. On Thursday, March 27, the volcano erupted with a loud bang at 12:30 p.m. Ash and smoke began pouring from a newly blasted crater at the mountain's top, and soon Mt. St. Helens's east flanks were covered with a fine dusting of volcanic ash. Since then the mountain has remained active with only occasional pauses. Several mud slides have occurred as the glaciers and snow pack on the mountain began melting from the heat. The first crater, about 1,000 feet from the summit and about 300 by 450 feet in diameter, has been joined by a second crater about 30 feet away. Both craters, which lie in the crater scar from the 19th century activity, continue to widen and by Tuesday, April 1, had fused with one another to form one large opening. Steam explosions continue to come from the craters, sending columns of ash and smoke as high as 15,000 to 20,000 feet above sea level. Dust from the plume has been spotted settling to the ground as far as away as Spokane, about 300 miles to the northeast.

So far, USGS scientists report no evidence of juvenile, or newly formed, magma in their samples. This means, says one, that the volcano is still in the "throat-clearing" stage — spewing out old material. A University of Idaho geologist, however, claims to have found evidence for fresh magma. Charles R. Knowles re-

ported the discovery of "Pele's hair"—fine strands of volcanic glass formed when hot magma is blown into the air—which he says indicates the presence of newly formed magma. Knowles's finding has not been confirmed, however, and Don Mullineaux of the uscs maintains that only old material is being erupted. The depth of earthquakes that occurred before March 31 indicated, however, that fresh magma may lie only 3,000 feet below the summit.

Something else to tantalize the geologists has been the sighting of a blue glow in the older crater and lightning arching between the craters. A spokeswoman has speculated that the blue glow might be some kind of incandescent gas, and geologists suggest that the lightning might be the result of ash particles rubbing together and producing static electricity.

On March 31 and April 1 and 2, four sharp earthquakes appeared to alter the seismic character of the eruption. The four, measuring 4.8 (the largest yet recorded), 4.7, 4.5 and 4.6 on the Richter scale, propagated southward and were focused deeper

than previous northward-trending quakes, said uscs scientists. The significance of the change in seismicity is not clear. Crude tilt measurements taken Tuesday at Spirit Lake, a reservoir on the volcano's northern flank, showed that the south shore of the lake had tilted upward about one-half inch, possibly indicating swelling due to rising magma. At about the same time, the volcano released one of its heaviest and highest plumes, which rose nearly four miles into the sky. After a period of relative calm, the volcano seemed to be stepping up its activities, according to a uscs spokesman.

Could Mt. St. Helens blow its top—literally, as did ancient Mount Mazama when it formed Crater Lake? Geologists say it is extremely unlikely. Warns seismologist Dave Johnson: "There's more danger from snow melts, mud flows and avalanches than from anything else." Mt. St. Helens, if its geological history is any guide, will probably spit mostly ashes and cinders. But the eruption could continue, on and off, for years. □

Leboyer method challenged

In *Birth Without Violence* (Alfred A. Knopf, 1975), Frederick Leboyer advocated ways to make birth a more humane process. Specifically, he advised that infants be delivered in a dark, quiet, warm room, not in a harshly lit, noisy, cold one; that infants not be given the traditional slap on the rear and immediately severed from the umbilical cord, but be placed on their mothers' abdomens and kept attached to the cord for about five minutes; and that infants not be put on a cold scale but in a warm bath (SN: 8/16/75, p. 106).

A study supporting the advantages of the Leboyer delivery over a more conventional one was published in 1976 by Danièle Rappoport of the French National Center for Scientific Research. Rappoport found that children born by the Leboyer approach seemed protected from the colic and shortness of breath sometimes seen during the first months of life, showed marked ambidexterity, began walking at an earlier age than average, displayed less than the normal amount of trouble in self-feeding and toilet training and had a higher-than-average I.Q. (SN: 1/22/77, p. 59). A drawback of the study, however, was that no control subjects were used.

Now an investigation that fails to find the Leboyer method superior to a more conventional delivery is reported in the March 20 *NEW ENGLAND JOURNAL OF MEDICINE* by Nancy M. Nelson and colleagues at McMaster University Medical Center in Hamilton, Ontario. Like the earlier study, though, it has some weaknesses.

Nelson and her co-workers randomly assigned 56 women to either a Leboyer delivery or a more conventional delivery, but one in which newborns were treated gently and encouraged to interact with

their parents. For instance, infants in the latter group didn't get a slap on the rear, but were delivered in a room lit by fluorescent lights, were severed from the umbilical cord within a minute after delivery and did not get a warm bath. The researchers then used a variety of clinical and behavioral tests to assess the outcome of the infants in both groups. As they report, no statistically significant differences between the two groups could be found in newborn deaths, or in infant behavior during the first hour of life, at 24 to 72 hours after birth, or at eight months of age. In fact, a number of newborns in the Leboyer group reacted to the warm bath with irritation and crying, not pleasure. These results, Nelson and her colleagues conclude, suggest that the Leboyer procedure is no more beneficial to children than a more conventional, gentle delivery is.

It could be argued, of course, that if the Leboyer approach were scientifically compared with the harsher, more anachronistic delivery practices condemned by Leboyer and many other perinatal authorities today, the Leboyer approach would be found to be vastly superior. Nelson and her team are the first to concede this. The reason they did not compare the Leboyer method to such methods is that the latter are not in use at their center. Still another weakness in this study, Nelson and her team point out, is that the behavioral tests used might not have been as sensitive as they could have been. In an accompanying editorial, Raymond S. Duff, a physician at the Yale University School of Medicine, agrees: "Life may be so complex that much meaning is lost in oversimplifying it as the science of Nelson and her colleagues seems to do." □

The grim reefer? Questions remain

Since the *Report of the Indian Hemp Drugs Commission of 1893-94*—one of the earliest attempts to assess the health effects of marijuana—cannabis has been the subject of continuing scientific investigations. A recently released report, *1980 Marijuana and Health*, highlights the most recent results of these investigations through the end of 1979. It is the eighth annual report of its kind to Congress from the Department of Health, Education and Welfare.

The report is prefaced with the acknowledgment that many questions remain unanswered: "Although it is not yet possible to be definitive in our answers . . . the report once again tries to answer the central question as best it can be answered at this time: 'What are the health implications of marijuana use for Americans?'" Indeed, the report is riddled with caveats, page after page of which justify this introductory caution.

In a section on the effects of chronic marijuana use on intellectual functioning, for example, although HEW finds the results "provocative," it concludes that the results "should be more carefully explored." The "provocative" results include the finding that chronic cannabis users in northern India scored significantly lower than non-users on measures of intelligence, memory and time perception. The HEW authors indicate, however, that other lifestyle factors, such as inadequate diet, may have contributed to the inferior performance of the marijuana users: "Since users were from among the poorer groups in the society, the cost of their cannabis might well significantly reduce the amounts available for food purchases."

Similarly inconclusive are reports on the reproductive effects of marijuana. Although results of animal and human studies suggest that heavy marijuana use diminishes the count and motility of sperm in males and shortens the period of potential fertility (the luteal phase of the menstrual cycle) in females, the HEW report cautions that the findings "must be regarded as preliminary." HEW discourages use of marijuana during pregnancy, however, "given the many unknowns concerning the effects of marijuana on fetal development."

HEW also is concerned with the impact of a marijuana "high" on classroom learning. Since marijuana seems to affect short-term memory, "It is likely that its use is having a detrimental effect on . . . classroom functioning and knowledge acquisition."

Among the more decided aspects of marijuana use mentioned in the HEW report is an increase in young (less than 18 years old) users (SN: 5/6/78, p. 296; 5/5/79, p. 297) and the following health effects: