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 USGS 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 USGS 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 USGS 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:

increased heart rate, an impaired driving ability and related skills (SN: 2/4/78, p. 71) and decreased vital capacity — the amount of air the lungs can expel following a deep breath. Results of investigations of the effects of marijuana on the incidence of lung cancer (marijuana smoke contains the carcinogen benzopyrene), the body's immune system and DNA synthesis remain inconclusive.

Interestingly, the HEW report mentions studies of chronic cannabis users in Jamaica, Greece and Costa Rica that failed to find evidence of lung damage or impaired intellectual functioning. "This may have been because traditional users in those countries do not inhale cannabis smoke as deeply and retain it in their lungs as do American users," HEW reports.

But Larry Schott, director of the National Organization for the Reform of Marijuana Laws, contends that marijuana smokers in the three countries studied inhale no differently than American users do. "I rechecked this with professors [Vera] Rubin and [Lambros] Comitas [who conducted the Jamaican study]," Schott says. "They have videotapes of people smoking and working in the fields and, in their words, 'They [Jamaican marijuana smokers] suck it in clear to their toes.'"

Furthermore, Schott says, "We're not seeing anything new [in the HEW report]. It is probably one of the most equivocal reports ever released by the agency."

The HEW report maintains: "While all of us would wish for greater certainty in this area, such certainty is not yet possible. The American marijuana experience has been of brief duration." □

Formaldehyde peril

The National Academy of Sciences' recent pronouncement that formaldehyde is dangerous even at low levels is based on a survey of studies that took researchers to funeral homes (where the chemical is used in the embalming process), mobile homes (built with formaldehyde-containing particle board) and industrial settings.

The effects of formaldehyde exposure included skin, eye, nose and throat irritation. It produced thirst, headaches, dizziness, apathy and an inability to concentrate. Although an inhalation study of rats and mice has implicated the chemical as a potential carcinogen, similar results at the same concentration exposures have not yet been reported. Studies testing formaldehyde for mutagenicity also have yielded conflicting results.

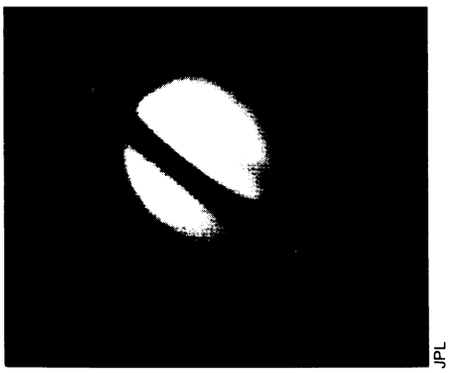
Sources of public exposure to formaldehyde include cigarette smoke, photochemical smog, automotive exhaust, foam insulation, coated nylon fabrics (see p. 217), shampoo and cosmetics. The academy recommends maintaining formaldehyde at the "lowest practical concentrations to minimize adverse effects on public health." □

Head-deep in planets

For all their worries about the future state of the U.S. space program (SN: 3/29/80, p. 196), many scientists have been virtually inundated by the rush of data from recent probes such as Viking, Pioneer 11, Pioneer Venus and Voyager. In many ways, the researchers are in the position of Lewis Carroll's Red Queen, who bemoaned having to run as quickly as possible merely to stay in one place. As a result, gatherings such as last month's Lunar and Planetary Science Conference in Houston sometimes become frantic affairs in which the participants fill notebooks as avidly as do students (or reporters) with findings from various planets, spacecraft and scientific disciplines, in hopes of keeping up with what's relevant to their own fields.

The Houston meeting, which began in 1969 as a session for moonrock investigators, is now a typical interplanetary potpourri. The moon is still a feature attraction, of course — most of the Apollo lunar samples have yet to be studied at all, and this year's conference included the preliminary report on an Apollo 12 core tube collected more than a decade ago. But sharing feature billing were Venus, Mars and Jupiter's spectacular Galilean satellites, along with a special session on meteorites from Antarctica, which in four brief collecting seasons has yielded some 4,700 examples amounting to about 40 percent of the total world meteorite "crop."

- Venus: Though the Pioneer Venus orbiter's radar mapper has not quite completed its coverage of the planet, researchers such as the U.S. Geological Survey's Harold Masursky now confidently state that Venus shows no signs of intraplate ridges, island arcs, subduction zones or other features that would suggest global-scale tectonics like the earth's. According to William M. Kaula of the University of California at Los Angeles, "It looks as though Venus has evolved much more continental crust [than the earth], leading to a thick layer of buoyant material which has squelched plate tectonics. The most evident cause-and effect chain," he says, "is that the absence of water led to higher surface temperatures, which led [through other steps] ... to a greater proportion of basaltic differentiate floating rather than sinking, which led finally to shutting off plate tectonics, alas." Yet this does not necessarily mean that Venus is a completely inactive world. Shallow quakes detected on the moon, says Yoshio Nakamura of the University of Texas, appear quite similar to types of terrestrial earthquakes that do not depend on intraplate movements. Perhaps the lack of such movements on Venus need not write it off as a tectonically dead planet.
- Mars: One of the rusty world's most prominent features is the huge Tharsis rise, a bulge covering a sixth of the planet and bearing several huge volcanoes including Olympus Mons, three times the height of Mt. Everest and as wide as New Mexico. So massive that its formation has been blamed by some researchers for radically changing the tilt of Mars on its axis, Tharsis is often described as an "uplift," implying a feature forced upward by heat in the underlying mantle. Sean C. Solomon of the Massachusetts Institute of Technology, however, believes that it may not be an uplift at all, but a mere thickening of the crust, created where fracturing concentrated around a thin region in the lithosphere to let through successive layers of lava, each one piling atop the next like a stack of pancakes. Understanding the origin of Tharsis is not a trivial matter, since the monstrous bulge is one of the keys to Martian geologic history, as well as — if its birth indeed re-tilted the planet — the history of the planet's changing climate.
- Io: Jupiter's breathtaking, volcanically active satellite has been one of the focal points of the solar system ever since its eruptions were discovered a year ago by the Voyager 1 spacecraft's cameras. At the Houston meeting, Dennis L. Matson and colleagues from Jet Propulsion Laboratory reported an analysis of earth-based infrared measurements indicating that Io is a real cooker: Every square centimeter of its surface appears to be giving off an average of 48 (± 24) microcalories of heat per second — about 30 times the average for earth and 90 times that of earth's moon. Five times earth's distance from the sun, Io is still a chilly place, with most of its surface at about 148°C below zero, but the average heat flow is brought up by numerous volcanic "hotspots." The University of Hawaii's William Sinton cites other earth-based data indicating that (according to Sinton's hypothetical model) as much as 200 square kilometers of Io's surface may be at a temperature of 327°C (621°F), with another 40,000 square kilometers at 27°C (81°F), on the balmy side of "room temperature." Close-up data from the two Voyager spacecraft are now being analyzed. And the data crush will continue: Voyager 1 has already photographed Saturn, and will get there in November. □



JPL

Saturn and moon Rhea from Voyager 1, 312 million km out on March 20. Composite was made from photos differently exposed for bright planet and dim rings, so rings appear as shadow where they cross disk.