The Planet People: Riches and Rue

It is not uncommon for scientific meetings, faced with accommodating numerous presentations of new research results, to be conducted in concurrent sessions, with participants reporting their findings simultaneously in two, three or more different rooms (a day at a recent American Chemical Society conference offered more than 60). The American Astronomical Society's Division for Planetary Sciences has generally managed to avoid any such overlap (sometimes by limiting talks to five minutes), but the recent flush of data from interplanetary spacecraft and increasingly sophisticated ground-based equipment (plus complaints about the five-minute limit) has finally forced the DPS to give in. More than half of the time at the group's annual meeting last week in Tucson, Ariz., was marked by double sessions, as researchers dashed between rooms to catch the latest word on the worlds of the solar system, surely a sign of a burgeoning area of knowledge.

Yet appearances can be misleading. Since 1963, said Bruce Murray, director of Jet Propulsion Laboratory in Pasadena, there has never been a period of as long as 12 months when some U.S. spacecraft was not studying or approaching some distant planet or satellite. But following Voyager 2's encounter with Saturn next August, there will commence a gap of at least four and a half years with no planet-bound U.S. probes at all, and there is only a single mission — the Galileo orbiter and probe of Jupiter — even in the works. Furthermore, Murray warned the DPS'ers, much earth-based planetary research depends on the spacecraft results for both data and funding impetus, and thus could suffer as well.

The uncertainty extends beyond the missions themselves. National Aeronautics and Space Administration head Robert Frosch recently announced his forthcoming resignation, and the agency's respected chief scientist — Thomas A. Mutch, formerly in charge of the Viking lander cameras on Mars — was killed only days before the DPS meeting in a tragic mountain-climbing accident in the Himalayas. In addition, the directors of three of the four divisions in NASA's Office of Space Science (Angelo Guastaferro of the planetary division, Franklin D. Martin of the astrophysics division and Harold Glaser of the solar-terrestrial division) are said to be planning to leave NASA headquarters.

"Is this [just] the end of the beginning," Murray asked regarding the planetary program's current woes, "or is it the beginning of the end?"

Despite such forebodings, the DPS meeting was jam-packed with new findings and speculations:

Photos: Viking Orbiter 1/JPL

A Martian near-surface cloud (with its shadow), seen in two photos 4.48 seconds apart, is suggested by one researcher to have possibly come from an active volcanic vent, conceivably linking volcanism and the planet's dust storms.

• *Saturn:* As the major target of the Voyager 1 spacecraft's upcoming Nov. 12 flyby, it was a particular focus of attention. Perhaps the most unusual proposal was put forward by Voyager team members A.F. Cook and R.J. Terrile, who have concluded that the planet's recently discovered E-ring may consist of ice particles literally spurted into place through meteorite holes punched in the crust of the Saturnian satellite Enceladus. Just as the volcanism on Jupiter's moon Io is believed due to tidal stresses caused by the gravitational attraction of the nearby moon Europa, Enceladus may be heated by tidal interactions with Dione, another satellite of Saturn. This could mean that Enceladus has a mantle of liquid water beneath a frozen crust. Meteorite impacts puncturing the crust would allow water droplets to escape into space, where they would freeze into bits of ice and form the E-ring. Infrared studies indicate that the ring particles are small, which suggests that they stay in position for a relatively short time before spiralling in to mix with the main visible rings, but periodic impacts could renew the supply. "A couple of hits every 10,000 years," says Terrile, "and you can populate the E-ring."

Saturn itself, meanwhile, unlike spectacular Jupiter, has steadfastly maintained a bland face throughout the months of Voyager 1's picture-taking. Lately, however, a few striking features have finally been appearing in the cloud tops, such as a few strangely short-lived bright spots. The rings, too, have been showing signs of structural detail, in patterns strikingly different from just circumferential stripes. Never before seen, some of the patterns resemble dark, radial "fingers" that are clearly not permanent, but whose few-hour lifetime is nonetheless puzzlingly long. The problem is that at the inner (near-Saturn) edge of the new features, ring particles orbit Saturn about every 9½ hours, while particles at the outer edge take more than an hour longer — which might be expected to erase such features in less time than they have been observed to last.

• *Mars:* Amid the diverse world's many surprises, its upper atmosphere is apparently a natural laser, pumped by photons of sunlight and detected from high-resolution infrared heterodyne spectroscopy by Theodore Kostiuk, Michael Mumma and colleagues from the NASA Goddard Space Flight Center, using Kitt Peak's McMath Solar Telescope in Arizona. Carbon dioxide molecules from the atmosphere are excited by the photons, producing a laser's characteristic cascading ("stimulated") emissions. The cascade is sustained by the atmosphere's low temperature, which keeps down the population of less-excited molecules that would "quench" the process. In 1976, the researchers noted spectral signs of a natural ammonia laser operating from the polar regions of Jupiter's atmosphere, but did not publish their conclusion because they were — and still are — puzzled by the source of the energy necessary to "pump" the laser at the ammonia's depth in the atmosphere.

A particularly momentous discovery on Mars would be the existence of active volcanism. Many scientists acknowledge that it could well be there, but finding evidence for it is another matter. Leonard J. Martin of Lowell Observatory cites Viking orbiter photos of near-surface clouds, dark radial streaks on the surface and other features as possible indications of volcanic venting, which, he says, might be the trigger for some of the vast Martian dust storms. His DPS report drew more skepticism than acceptance, although, as one skeptic acknowledged, finding real proof of Martian volcanism would be "a plum."

• *Jupiter:* In view of Jupiter's powerful magnetic field, radiation belts, radio emissions and other electromagnetic phenomena, it is not surprising that the planet has prompted expectations of vast numbers of huge lightning bolts. Based on acetylene measurements, one researcher made a pre-Voyager estimate of 245 bolts per square kilometer per year in the Jovian cloud tops (SN: 5/12/79, p. 312), and Voyager photographed bolts as big as earth's biggest. Analyzing Voyager's lightning photos and plasma-wave data, however, John Lewis of MIT reports that "the chemical consequences of Jovian electrical discharges are negligible." □

SOS boycotts Moscow

The ranks of those banning scientific relations with the Soviets have swelled to about 7,900 since an organized campaign to cold-shoulder Moscow began 18 months ago (SN: 3/17/79, p. 168). Propelled by disgust at the Soviets' jailing and oppression of dissident scientists, SOS (for jailed or exiled dissidents A. Shcharansky, Y. Orlov and A. Sakharov) was created. Next month, 35 signatories of the 1975 Helsinki human-rights pact will review each other's compliance. Whether SOS decides to end its ban "will depend partly on actions taken at that conference, says SOS organizing chairman Morris Pripstein. □

Gene advisers narrow role

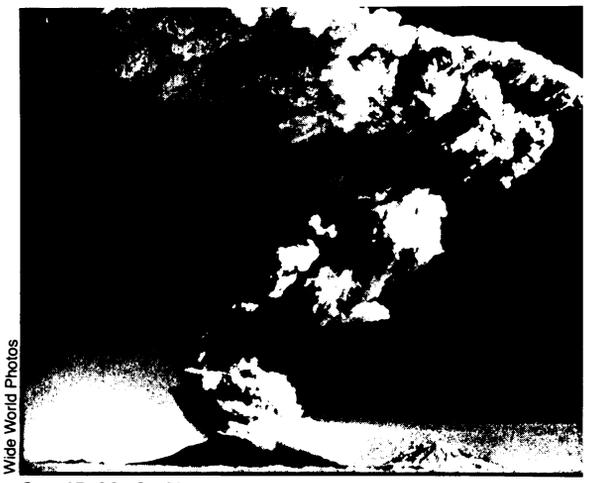
The national committee that oversees research with recombinant DNA has proposed a further reduction of its regulatory role. If approved by the director of the National Institutes of Health, another 17 percent of all recombinant DNA research would be evaluated by local biosafety committees. The only research to be reviewed by the NIH committee would be approximately 3 percent for which safety requirements are not clear from the guidelines. The committee also proposed that it no longer review fermenter design and containment hardware as part of scale-up proposals by industry. Members of the committee felt they did not have the expertise for such evaluations, which will be left to local biosafety committees. □

Mt. St. Helens does it again

Like the readers of a John Le Carré novel, geologists at Mt. St. Helens are finding that they have to be well into the story before they can figure out what's going on. Now, five months into the "story" of the volcano, scientists discovered that it is still capable of twists that are both new and yet tantalizingly familiar.

The most recent twist began midafternoon Oct. 16 when seismologists at the University of Washington in Seattle noted an increase in the frequency and intensity of earthquakes beneath the volcano. By 8:30 p.m. local time, according to U.S. Geological Survey volcanologist Susan Russell-Robinson, the continued activity prompted the seismologists to issue an alert saying that an eruption was possible within 24 hours. At 9:58 p.m., accompanied by a brief burst of seismic activity, a 42,000-foot cloud of ash shot from the volcano. This eruption, the first major blast since Aug. 7, was followed by a larger one at 9:28 a.m. Oct. 17, a third at 9:14 p.m. that day and two smaller blasts at 12:35 p.m. and 2:28 p.m. on Oct. 18.

On Oct. 16, says University of Washington seismologist Steve Malone, the pattern seemed a familiar one, much like that seen before the eruption of July 22. So far, he says, the volcano has shown two types of precursory activity: The July 22 type of build-up in the size and number of shallow quakes with few harmonic tremors (caused by the movement of magma) or, like that seen before eruptions on June 13 and Aug. 7, a lot of harmonic tremors and few shallow quakes.



Wide World Photos

Oct. 17: Mt. St. Helens reruns with a bang.

Yet the most recent spate of activity differs from that of July 22, Malone notes, because of the long periods between individual explosions and the lack of precursory signals before each subsequent blast. For these reasons, the volcano sitters have dubbed this round an "eruptive sequence." Despite the lull since Oct. 18 and the growth of a new lava dome in the crater — usually a sign of quiet — they were not ready to close this chapter until a deep quake was detected on Oct. 21. Malone says that this seismic sign-off — that tells, like distant thunder, of the passing storm — has been noted after each previous eruption. □

Spliced genes make splash on market

Genes were hot on Wall Street last week when, for the first time, a genetic engineering company went public. Sale of stock of Genentech, a San Francisco-based company (SN: 3/29/80, p. 202), provided the most striking price explosion of a new stock in at least a decade, analysts say. Before selling began it was clear that demand far exceeded the 1 million shares of Genentech offered at $35 each. One securities firm alone had customer requests for more than 3 million shares. The Washington office of E. F. Hutton had requests for more than 100,000 shares and was allotted only 50. Those went to one customer whose name was drawn from a hat.

Thousands of investors who did not get stock at the offering price immediately bid higher. In the first over-the-counter trading, the price of Genentech stock was $80 per share and it climbed to $89 within 20 minutes. After a week of busy trading, it stabilized at about $56. At the peak in stock price, Genentech was valued at $650 million, approximately the same as the Chrysler Corp., for example, or about a third the market value of the major chemical company Monsanto. Even at $56 per share, the market value of Genentech is well above that of American Airlines. In addition to the million shares now owned by public investors, 6.5 million shares of Genentech are owned by its founders, directors and employees and early private shareholders. Herbert W. Boyer, the University of California scientist who did early gene-splicing work and who was cofounder of the company, has 925,000 shares, now worth $52 million.

The four-year-old company still has no product on the market, although it did make a small profit ($80,000) during the first six months of 1980. In its most advanced projects, Genentech has pilot-plant-level production of such scarce materials as human insulin and human growth hormone, which are expected to be clinically valuable.

The activity of the Genentech stock may have as much to do with the psychology of the market as with public confidence in gene-splicing, stock analyst Nelson Schneider of E. F. Hutton says. He reports that recently there have been other large increases in value of new stocks oriented toward novel technologies, but the dramatic Genentech action is the first to catch public attention. Schneider speculates, "It may be a signal of a whole new bull market on Wall Street." □