— an almost surely volcanically constructed peak some 700 km across with a summit rising 10 km above its surroundings and complete with an apparent central depression — and, to the north, Rhea Mons, rough-surfaced but with a far less classically formed peak. The Arecibo image extends about 2,500 km from south to north, and clearly reveals a family of parallel, linear features running between Theia and Rhea and known as Devana Chasma. Altimetry measurements from the Pioneer Venus orbiter indicate a linear trough running down the region, and when combined with the Arecibo image, the total picture is of a vast rift zone, as much as 350 km in width.

A further display of the planet's apparently widespread volcanism shows in an Arecibo image of an area southeast of a vast highland known as Lakshmi Planum. Numerous complex patterns (variations in surface roughness) bedeck the northwest portion of the image, but most exciting, says Head, are the "lobate" shapes to the southeast, strongly resembling the contours of great basaltic flows.

But there was far more to the Rockfest than the rock of Venus. The consensus at last year's meeting that at least one meteorite has come to earth from the moon, for example, renewed the question of whether certain others have come from Mars. And with no known Marsrocks for comparison, the issue last week was still two-sided.

Nor was the meeting limited to extraterrestrial items. One earthrock from northwestern Australia, according to three researchers from NASA's Johnson Space Center, contains tiny, sealed pockets of gas and liquid — "fluid inclusions" — which may hold traces of earth's atmosphere just as it was more than 3 billion years ago. Such inclusions are common in some kinds of rock, but many contain fluid that merely happened to leak in along fractures in, say, a piece of quartz. There are also sealed inclusions, but the likeliest kind is simply a bubble of volcanic gas from the magma in which the rock formed, rather than a bit of the ambient atmosphere itself.

The Australian rock, however, says NASA's Everett K. Gibson Jr., is not a volcanic rock at all, but an evaporite (formed of barite crystals that replaced the original gypsum with no heat involved) — and the fluid in some of its inclusions may have been trapped as the crystals grew, rather than let in by leakage. The rock has been dated at 3.4 billion years, and the possibly ancient fluid, analyzed by a sophisticated laser microprobe/gas chromatograph, seems to contain no oxygen, no nitrogen — just carbon dioxide, the expected principal constituent if, as some researchers believe, the earth originally had a reducing atmosphere. What changed the atmosphere to an oxidizing one? Life — without which earth's atmosphere might more closely resemble that of, well, Venus.

— *J. Eberhart*

Magnesium plays a role in hypertension

Ask most people what causes high blood pressure and they will probably accuse dietary sodium and salt. Within the medical community, however, the answers tend to be more complex and controversial; research points to a number of culprits including other nutritional factors and genetic makeup. Now, a study linking hypertension to magnesium deficiency in the diets of rats secures the membership of magnesium in the club of agents that may play a role — perhaps as important as sodium — in blood pressure regulation.

Physiologist Burton M. Altura at the Downstate Medical Center in Brooklyn, N.Y., and co-workers fed rats one of three diets containing different amounts of magnesium. The researchers report in the March 23 SCIENCE that after 12 weeks the mean arterial blood pressure of rats fed a diet severely deficient in magnesium was 32 millimeters of mercury (mmHg) higher than the near-normal 111 mmHg pressure found in animals fed a magnesium-enriched diet. The pressure of moderately deprived rats measured 131 mmHg.

Lawrence Resnick, an endocrinologist and cardiologist at Cornell University Medical Center in New York, says that the unique aspect of Altura's findings is that he related the increased pressure to actual changes in the size of blood vessels; the vessels were most constricted in animals that were most severely magnesium depleted.

But Resnick and others think that the rat study is not relevant to humans in general because most people get enough magnesium in their diets. (Unprocessed grains and legumes are high in magnesium.) Resnick also contends that the magnesium levels in the blood of most hypertensives fall in the range of people with normal blood pressure.

However, there are two large subgroups of the population, Resnick and other researchers acknowledge, that are magnesium depleted. Altura notes that 80 percent of all alcoholics have very low levels of magnesium. Resnick adds that alcoholics are also predisposed to hypertension, although the cause is still being debated. The other group consists of people taking diuretics — the fifth most widely used prescription drug in the United States, according to a recent JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. While diuretics are used to attenuate hypertension by expelling salts, they also waste magnesium, says Altura. He cites a recent Swedish study in which the pressure-lowering effects of diuretics were enhanced by giving patients supplemental magnesium.

Altura adds to this list people who live in areas with soft water and magnesium-poor soil. He says that epidemiologists have found unusually high incidences of hypertension and cardiovascular disorders in some of these regions. He also notes that magnesium levels in the U.S. diet have been dropping from an average 475 milligrams (mg) per person per day in 1900 to 245 mg today partially because of changes in diet and agriculture.

Altura thinks that magnesium deficiency ties in with theories on salt and hypertension because magnesium, he believes, regulates the sodium-calcium exchange pump of the cells. When sodium levels are high and magnesium is low, he says, the pump is inefficient. Cells become loaded with calcium, which in turn makes blood vessels contract. Resnick tempers this theory by saying that in all likelihood the important ions — calcium, potassium, sodium and magnesium — mutually regulate one another by complex mechanisms that are far from understood. "We're all like the blind men," he says, each describing the whole elephant differently because we're each touching different parts.

What Altura's group has done, says Resnick, is bring attention to a long-ignored ion and entice clinicians to develop techniques for monitoring magnesium metabolism in humans.

Altura thinks that more studies supporting the role of magnesium in hypertension and heart disease will emerge in the next few years. "We're happy that we have been prime movers in bringing a lot of this evidence to the forefront," he says.

—*S. Weisburd*

New clues to lung hazard in mines

A new animal study suggests how chronic inhalation of low levels of coal dust and diesel exhaust might affect a miner's lungs. A National Institute of Occupational Safety and Health (NIOSH) researcher in Morgantown, W.Va., found that the pollutants both appear to negatively affect alveolar macrophages, although in exactly opposite ways. These scavenger cells are responsible for engulfing foreign bodies to protect the surface of little air sacs deep within the lung.

Large dust particles don't usually travel deeply into the lung, but instead land on mucus lining the lung's larger airways, explains Vincent Castranova, the NIOSH scientist. Because mucus is constantly flowing out of the lung by what he terms the "muco-ciliary escalator," the larger particles usually clear out fairly readily. Smaller ones, however, can enter into the deep reaches of the lung — to the alveoli, or little air sacs. Here, particles "are too deep to be removed by the muco-ciliary escalator," Castranova says, so their only way out "is by macrophages engulfing them." Once a macrophage does that, "it will climb up the airways and get on the