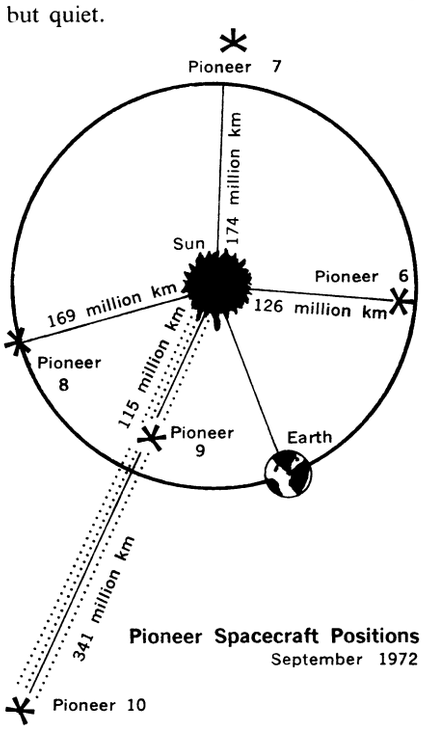
ters and 33 kilometers revealed small quantities of ammonia—between 0.01 and 0.1 percent. In a preliminary report in July, the scientists mentioned short-lived substances in the clouds that appeared to be indicative of "stormy volcanic activities on the surface." No such mention was made this time.

Venus 8 also measured wind velocities. At an altitude of 45 kilometers, the wind was moving horizontally at 50 meters per second. It decreased during descent to less than 2 meters per second. At 10 to 12 kilometers, the measurements indicated "there is a zonal, latitudinal wind directed from the terminator to the day side" in the same direction of the planet's rotation.

The surface layer of Venus appears loose and has a density of slightly less than 1.5 grams per cubic centimeter. A gamma-ray spectrometer indicated the surface soil to be "relatively rich in potassium, uranium and thorium." It contained 4 percent potassium, 0.0002 percent uranium and 0.00065 percent thorium. Tass likened these radioactive concentrations to the composition of terrestrial granite. □

5 Pioneer spacecraft observe solar storm

Plasma physicists got an extra bonus last month from five Pioneer spacecraft. John Wolfe of NASA's Ames Research Center and other scientists had planned to use a unique alignment of Pioneers 9 and 10 to measure the solar gases in a quiet state. At the time Pioneer 9 was about 115 million kilometers from the sun; Pioneer 10, about 341 million kilometers. What they saw was anything but quiet.



Pioneer Spacecraft Positions
September 1972

A solar storm was in progress (SN: 8/19/72, p. 119). Three explosions occurred on Aug. 2 and a fourth on Aug. 7. During one one-hour period, the sun produced energy equal to the U. S. electrical power consumption for 100 million years at the present rates. It caused a temporary but violent warping in the earth's magnetic field which caused power and communications blackouts on earth.

Pioneer 9 saw the highest solar wind speeds ever recorded—1,000 kilometers per second. The typical solar wind velocities are from 400 to 700 kilometers per second. The highest previously observed had been 800 kilometers per second.

By the time these solar wind particles had reached Pioneer 10, 76 hours and 226 million kilometers after they passed Pioneer 9, their velocity had decreased by half. But their temperature had risen to 2 million degrees K., far above the usual 100,000 degrees K. What happened, Wolfe believes, is that the kinetic energy of the particles was converted into thermal energy. "We've never seen anything like this before," he says of the event.

Pioneer 9's sensors also saw 4,000 times more solar cosmic rays than normal. This was confirmed by Pioneer 6 (at the time about 126 million kilometers from the sun), which recorded the greatest number of high-energy particles ever seen. At the peak of the storm, these cosmic rays reached Pioneer 9 in less than one hour, compared with the 33 hours for the solar wind particles. At Pioneer 10 the interplanetary magnetic field was 100 times higher than normal.

"Space is a fantastic plasma laboratory for observing on a huge scale how charged particles and magnetic fields act in a vacuum," Wolfe notes. "We've never been able to observe how these disturbances move out into the interplanetary medium before."

The stormy solar region 331 has now rotated away from the earth, but measurements by the other Pioneers indicate the sun is still spouting out particles and X-rays in massive amounts. Pioneers 6, 7 and 8 will continue to observe the source area, although the amount of data scientists will get from these craft are severely limited due to other demands on the use of the huge space antenna, the 210-foot dish at Goldstone, Calif.

Meanwhile, Pioneer 10, heading for Jupiter, was moving safely through the asteroid belt. In fact, says Wolfe, it has so far seen no significant increase in the number of the small particles one-millionth of a gram or smaller. This week there were indications that the count might be going up a bit. □

Prostaglandin complicity in rheumatoid arthritis

NYU School of Medicine
Prostaglandin-researcher Weissmann.

More than five million Americans, the Arthritis Foundation estimates, are victims of rheumatoid arthritis, a potentially crippling disease characterized by persistent inflammation, usually of the joints. Treatment can help relieve the symptoms of the disease but not cure it. However, scientists are relentlessly closing in in the causes of inflammation, and they anticipate the work will eventually, lead to better drug therapy.

Ordinarily, immune responses are essential to health. Antibodies or other natural body chemicals participate in these reactions. But abnormal immune responses, many researchers believe, are capable of causing tissue inflammation. In other word, normal defense mechanisms of the body turn against the body itself. This autoimmune theory for rheumatoid arthritis is today a predominant one, according to John L. Decker of the National Institute of Arthritis, Metabolism and Digestive Diseases, and president of the American Rheumatism Association.

During the past five years or so, and especially in recent months, prostaglandins have become more and more suspect of triggering inflammation. Prostaglandins are hormone-like substances that act locally in many tissues of the body. A year ago, John Vane, J. Bryan Smith and Anthony Willis of the Royal College of Surgeons in London found that aspirin can prevent laboratory synthesis of prostaglandins (SN: 7/17/71, p. 39). Since then, other researchers have confirmed the discovery in patients. The Sept. 1 NATURE reports, for