

Jupiter's decimetric radiation

Jupiter is the only planet other than the earth definitely known to possess radiation belts, an outer atmosphere inhabited by electrically charged particles trapped by the planet's magnetic field. This magnetosphere is believed to be the source of the decimetric (not to be confused with the dekametric) radio emanations that come from the planet.

Since the sun is expected to be the major source of electrons for the Jovian radiation belts, M. J. Klein, S. Gulkis and C. T. Stelzried of the Jet Propulsion Laboratory monitored the decimetric radiation at weekly intervals over six months to see whether there was any correlation with solar activity.

They report in the Sept. 1 *ASTROPHYSICAL JOURNAL LETTERS* that the intensity of the decimetric radiation has apparently declined in strength by 20 percent since 1964. Short-term variations had been known before, but this is the first evidence of a long-term one. The JPL investigators sought to find a long-term correlation between solar activity and the changes in the Jovian decimetric flux. They found no confirmation of any simple relationship, and they suggest that more observation is needed before the variations can be explained.

Interstellar hydrogen sulfide

A new addition to the list of interstellar chemical compounds is hydrogen sulfide. Its discovery is reported in the Sept. 1 *ASTROPHYSICAL JOURNAL LETTERS* by Patrick Thaddeus and M. L. Kutner of the Goddard Institute for Space Studies and A. A. Penzias, R. W. Wilson and K. B. Jefferts of Bell Telephone Laboratories.

The evidence is the spectral line of the compound at 168.7 gigahertz frequency (1.78 millimeters wavelength), which results from a change in the molecule's rotation. The discovery was not unexpected since three other molecules containing sulfur (CS, OCS, H₂CS) have already been found, and for chemical reasons they would be expected to be less abundant than hydrogen sulfide. Nevertheless, the discoverers say, this is the first time hydrogen sulfide has been found in any celestial source, star, planet, or dust cloud.

The hydrogen sulfide appears in some of the same clouds as other interstellar molecules. It tends to appear in extended areas a few minutes of arc across. The discoverers calculate that it is only a moderately common interstellar substance, less abundant than the ubiquitous hydrogen cyanide and much less abundant than carbon monoxide.

And still no light on the Vela pulsar

According to the theory that regards pulsars as rotating neutron stars, only those rotating very fast should be able to emit pulses in visible light to go with their radio pulses. The fastest known pulsar, the one in the Crab nebula, emits not only optical pulses but also X-ray ones.

The pulsar in the constellation Vela is the only other known one that might have optical emissions. In the Sept. 1 *ASTROPHYSICAL JOURNAL LETTERS* Barry M. Lasker, Stephen Bracker and Oscar Saá of the Cerro Tololo Inter-American Observatory report still another failure to see it.

Another intestinal cancer antigen

An apparent tumor-specific antigen, known as carcinoembryonic antigen (CEA), was first noted in patients with digestive tract cancer in 1965 by Phil Gold and Sam Freedman of Montreal General Hospital. Since then, clinicians have hoped the antigen might be used as an early detector of stomach cancer. But the antigen has not raised antibody responses in a number of gut-tumor patients, suggesting the antigen probe might not be a good diagnostic tool after all.

In the Sept. 13 *NATURE NEW BIOLOGY*, though, Gold and Freedman report sensitive new methods for detecting antibody responses to the antigen. And in the Sept. 8 *SCIENCE*, Ariel C. Hollinshead and his team at the George Washington University Medical Center report they have taken, from intestinal cancer patients, another intestinal cancer antigen besides CEA.

"Our studies," the Washington scientists conclude, "have raised the question as to whether the . . . antigen circulates, like CEA, in the serum, whether each antigen has a distinct, biological role, and whether either or both of these antigens play a role in host resistance to intestinal cancer."

Fluoride and fertility

As more sensitive techniques become available for creating and correcting trace element deficiencies in experimental animals, more and more trace elements appear to be essential nutrients for humans. On the list are iron, iodine, copper, manganese, zinc, cobalt, molybdenum, selenium, chromium, tin and vanadium. One now emerging is fluoride.

Recently Klaus Schwarz of the Veterans Administration Hospital in Long Beach, Calif., found that fluoride added to the purified diets of young mice enhanced their growth and improved pigmentation of their incisor teeth. In the Sept. 8 *SCIENCE*, H. H. Messer and his biochemistry colleagues at the University of Minnesota report that female mice maintained on a low-fluoride diet over two generations showed a progressive decline in litter production. Mice receiving the same diet supplemented with fluoride reproduced normally and at consistent intervals. Addition of fluoride to the intake of females with impaired fertility restored reproduction.

Aspirin and the 'weaker sex'

Women's lib won't like it, but women are not equal to men, as far as the side effects of aspirin are concerned. Stomach ulcers in women have been linked with regular consumption of aspirin. No such link has been established for males. Such ulcers in women are known to be caused by intact aspirin, not by its breakdown products (metabolites). So René Menguy and his team at the University of Rochester School of Medicine hypothesized that the reason women are more susceptible to aspirin-caused ulcers is that the parent aspirin compound is broken down more slowly in their bodies.

They conducted a study to explore the possibility. As they report in the Sept. 8 *SCIENCE*, although there are individual differences in aspirin metabolism, women, on the whole, metabolize it significantly more slowly than do men. The key to aspirin-metabolizing capabilities is an enzyme system located in the blood, liver and kidney. The system may be sex-linked.