ASTRONOMY

Jupiter Rotation Slowed

A slowing of the rotation rate of Jupiter revealed a relationship between the planet's radio waves and the Great Red Spot for the first time.

➤ THE ROTATION RATE of the giant planet, Jupiter, suddenly slowed by 1.3 seconds in 1961, University of Florida scientists have found.

The change was detected both in four source of radio waves from Jupiter and in the Great Red Spot, a mysterious egg-shaped marking that has been visible for at least a hundred years.

This is the first time scientists have found a relationship between Jupiter's radio waves and the huge visible spot, Dr. A. G. Smith told the American Physical Society meeting in Washington, D. C. The Great Red Spot is 30,000 miles long, 7,000 miles wide, large enough to hold several earths easily.

With Dr. T. D. Carr, also of the University of Florida, Dr. Smith has been observing radio waves of the largest planet in the sun's system for eight years from stations in Gainesville and Chile.

Current theories link the radio sources with the solid ball of Jupiter. The decrease in rotation rate suggests that the planet itself, or a portion of its interior, has suddenly slowed its spin.

Prior to 1961, Jupiter's rotation rate, the fastest of any planet, was 9 hours, 55 minutes, 29.3 seconds.

Until 1961, Dr. Smith reported, the radio sources seemed to rotate at a constant speed, quite unlike the wandering clouds that perpetually hide Jupiter's surface from optical astronomers. The simultaneous change discovered in the rotational rate of the Great Red Spot may mean that the spot is also linked to Jupiter's surface, instead of being a detached, floating cloud as has been assumed.

The tentative interpretation that changes in the Great Red Spot are linked to Jupiter's rotation would mean that the planet had undergone even more "drastic changes" in the past, Dr. Smith said.

Jupiter's radio sources broadcast a powerful but intermittent jumble of noises covering most of the ordinary shortwave bands. The radio energy thus sprayed into space is about 50 million kilowatts—enough electrical power to supply the needs of France.

This outpouring of energy appears to vary with conditions on the sun, decreasing as the number of sunspots increases.

Jupiter's radio signals, Dr. Smith noted, are sufficiently strong to serve as a guide for an unmanned space probe, making it a relatively easy target.

Most scientists believe that Jupiter's radio noises result from charged particles from the sun temporarily trapped in the planet's magnetic field, somewhat like particles are confined in the earth's Van Allen radiation belts.

Of Jupiter's four radio sources, Dr. Smith said, two are 180 degrees apart and could be associated with the planet's magnetic poles. The other two are asymmetrical and might result from an abnormality in the magnetic field. The radio noise arrives in bursts and surges. The time interval between surges shows the rotation period.

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'Fairy Castles' on Moon

➤ THE CRUNCHY, highly porous material on the moon's surface forms structures like fairy castles, believes an astronomer. But underneath the castles, the material packs down to dense particles like a gravel pile.

This moon dust forms delicate fairy structures possessing vertical walls, vertical rills and steep-sided holes, explained Dr. Thomas Gold, Cornell University, Ithaca, N. Y.

At a depth of about nine feet, however, the substance packs down into firmer material by its own weight, Dr. Gold told the American Geophysical Union meeting in Washington, D. C.

At even lower depths it would be compacted into material of considerable strength.

Dr. Gold bases his statements on the lunar surface material from three distinct types of observable properties: the scattering reflection of optical light from the moon surface, the heat radiation both in the infrared and radio wave band, and the reflection of radio waves as observed with radar techniques.

The most obvious conclusion from each one of these lines of investigation is that the moon's surface is not bare solid rock, stated Dr. Gold.

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GENERAL SCIENCE

NAS Elects New Members

➤ THE NATIONAL ACADEMY OF SCIENCES elected 35 new members on the basis of distinguished and continuing achievements in original research.

They are: Thomas Foxen Anderson, biophysics, University of Pennsylvania; James Richard Arnold, chemistry, University of California, San Diego; Lipman Bers, mathematics, New York University; Raoul Bott, mathematics, Harvard University; Robert John Braidwood, anthropology; Oriental Institute; University of Chicago; Jule Gregory Charney, meteorology, Massachusetts Institute of Technology; David Yarrow Curtin, organic chemistry, University of Illinois; Philip Jackson Darlington Jr., zoology, Harvard University; Freeman John Dyson, physics, Institute for Advanced Study; Harold Eugene Edgerton, electrical engineering, Massachusetts Institute of Technology; Louis Barkhouse Flexner, anatomy, Institute of Neurological Sciences, University of Pennsylvania, and Department of Embryology, Carnegie Institution of Washington; Alfred Gilman, pharmacology, Albert Einstein College of Medicine, Yeshiva University; Walter Gordy, physics, Duke University; Philip Handler, biochemistry, Duke University School of Medicine; George Howard Herbig, astronomy, Lick Observatory, University of California; Fritz John, mathematics, New York University; Walter Joseph Kauzmann, chemistry, Princeton University; Eugene Patrick Kennedy, biochemistry, Harvard Medical School; Otto Krayer, pharmacology, Harvard Medical School; Stephen William Kuffler, neurophysiology, Harvard Medical School; Tsung-dao Lee, physics, Columbia University; Hans Lewy, mathematics, University of California, Berkeley; Oliver Howe Lowry, pharmacology, Washington University School of Medicine; Clark Blanchard Millikan, aeronautics, Guggenheim Aeronautical Laboratory and California Institute of Technology; George Peter Murdock, social anthropology, University of Pittsburgh; William Duwayne Neff, psychology, Indiana University; Keith Roberts Porter, biology, Harvard University; John Robert Raper, botany, Harvard University; Oscar Knefler Rice, chemistry, University of North Carolina; Kenneth David Roeder, physiology, Tufts University; Ernest Robert Sears, genetics, U.S. Department of Agriculture and University of Missouri; Richard Baldwin Turner, chemistry, Rice University; Cheves Thomson Walling, chemistry, Columbia University; Aaron Clement Waters, geology, University of California, Santa Barbara; and Thomas Huckle Weller, tropical public health, Harvard School of Public Health.

Six distinguished scientists from France, India, the Netherlands, Sweden and the United Kingdom were also elected as foreign associates by the Academy.

They are: Sir Christopher Andrewes, former deputy director of the National Institutes for Medical Research, London; J. B. S. Haldane, Genetics and Biometry Laboratory, Orissa, India; Sir Hans Krebs, biochemistry, Oxford University; Henrik Gunnar Lundegardh, plant physiology, College of Agriculture of Sweden and Research Laboratory in Plant Physiology, Penningby, Sweden; Marcel Gilles Josef Minnaert, astronomy, University of Utrecht and Utrecht Observatory; and Maurice Roy, Office National d'Etudes et de Recherches Aeronautiques, secretary-general of the International Union of Theoretical and Applied Mechanics and president of the International Committee on Space Research.

Election as a foreign associate is one of the highest honors that can be bestowed by the Academy on a scientist who is not a citizen of the United States.

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