

Two Spectroscopists Discover Sea of Gas Around Jupiter

Two University spectroscopists have discovered that the planet Jupiter is surrounded by a hydrogen gas sea at least 160 miles thick.

The new estimate is the result of experiments conducted with the world's largest absorption tube, which went into service here last year.

David H. Rank, professor of physics, and John V. Foltz, a NASA trainee and Ph.D. candidate in physics, conducted the research.

Findings Reported
Their findings, which are 10 times greater than previous research would indicate, are reported in a letter to the editor in the current issue of The Astrophysical Journal, published by the University of Chicago Press in conjunction with the American Astronomical Society.

The estimate is based on a comparison of spectral lines of a known "planetary atmosphere" created in the laboratory with the lines recorded in direct observation of Jupiter by large optical telescopes.

The most significant of these measurements was the observation last year of the quadrupole spectrum of hydrogen in photographs of Jupiter taken by the 100-inch optical telescope at Mount Wilson Observatory.

The observations were made by scientists at the Jet Propulsion Laboratory, who estimated the thickness of the hydrogen atmosphere surrounding Jupiter at 16 miles. Earlier estimates had placed the atmosphere at 3 miles thickness.

Fingerprints
Spectral lines, or the wavelength at which each element or compound will absorb or emit light, are sometimes called the "fingerprints of the universe" in that no two will absorb or emit light in the same pattern.

Thus, if the spectroscopist can create a planetary atmosphere in the laboratory whose spectrum matches the spectral readings from the planets, he can be secure in his knowledge that, with side effects eliminated, he has matched the planetary atmosphere. Moreover, the intensity of the lines provides a good estimate of the amount of the element or compound in the path of the light.

Because of its size, Penn State's new absorption tube, designed and constructed by Rank and his associate, T. A. Wiggins, professor of physics, has proved to be a unique instrument to recreate planetary atmospheres.

Filled With Hydrogen
The absorption tube, which for these experiments was filled with hydrogen, has a length of 150 feet, and a light beam may be reflected back and forth through the tube as many as 104 times. After the beam has passed back and forth through the tube the required number of times, it is reflected into the spectrograph proper to measure both the wavelength and the intensity of the absorbed light.

The spectrum resulting from the known quantity of hydrogen gas in the absorption tube was then compared to the JPL observation, as well as 1960 readings of Jupiter, to arrive at the figure of at least 160 miles of standard atmosphere. The 160-mile hydrogen atmosphere is regarded as "preliminary" and experiments are continuing.

The University stands sixth among colleges and universities in the nation in funds applied annually to engineering college research.

The University applies \$6.07 million to this research. This was announced in the 1963 Engineering College Research Review, published biennially by the Engineering College Research Council of the American Society for Engineering Education.

Total amount of these 126 institutions was about \$200 million. The top 10 colleges of engineering account for almost half this total. Eight of the 10 are state universities and land grant institutions.

The top 10 and their research resources in millions of dollars are:

Illinois Institute of Technology, \$22.81; University of Michigan, \$17.21; Massachusetts Institute of Technology, \$13.10; University of Illinois, \$11.46; University of Minnesota, \$6.68; The Pennsylvania State University, \$6.07; University of Denver, \$5.21; University of California, \$5.18; Cornell University, \$5.11; and Ohio State University, \$5.11.

Foundation Gets Award
The Milton S. Hershey Foundation has been chosen to receive the 1964 Benjamin Rush Award of the Dauphin County Medical Society.

Dr. Kermit L. Leitner, chairman of the society's awards committee, said the foundation was chosen for the award because of its endowment of the Milton S. Hershey Medical Center of The Pennsylvania State University to be located near Hershey.

Doctors Prescribe Rest, Relaxation For Weary Nehru



PRIME MINISTER NEHRU ... complete rest ordered

BHUBANESWAR, India (AP) — Weak and weary, Prime Minister Nehru went to bed yesterday under the care of doctors concerned about his tendency toward high blood pressure.

The doctors expressed hope for a quick recovery but they advised their 74-year-old patient, modern India's first and only chief of government, to take a complete rest and cancel all engagements for two weeks.

Nehru's illness has raised speculation about the possibility a successor might soon have to be found for him.

Low Ebb
Accumulated strains of government, politics and diplomacy caught up with Nehru at the annual meeting of his ruling Congress party in Bhubaneswar, the capital of Orissa State, near the Bay of Bengal 800 miles southeast of New Delhi.

Nehru looked listless in posture and facial expression and spoke to hardly anyone at a committee meeting Monday. He sat alone in a corner. He had flown to this city after delivering a speech, more than usually rambling, to the International Congress of Orientalists in New Delhi on Saturday.

Nehru's vitality has declined, visibly since he suffered an infection of the urinary tract in 1962. Working as foreign minister and Congress party chief, as well as prime minister, he has at times appeared so tired as to look asleep.

Some outside medical men have speculated that he is suffering from hardening of the arteries, a not unusual ailment in men of his age. His own doctors, who include a heart specialist, have refused comment.

No Struggle Seen
Despite interest in India and abroad about who might succeed Nehru, there was doubt here that any struggle for succession would come into the open under the present circumstances.

Prominent in casual speculation about who will be India's next prime minister is Lal Bahadur Shastri, a mild-mannered former Cabinet minister. Only 5 feet tall and weighing 104 pounds, Shastri could be a compromise between right and left forces in the Congress party. Nehru dropped him as home minister in a Cabinet reshuffle last fall.

PSU Sixth in Engineering Study Funds

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