

ASTRONOMY

Life May Exist on Jupiter

► LIFE MAY EXIST on Jupiter, the largest planet in the solar system, experiments have shown.

Generally, life on the cool planet 483,000,000 miles away from the sun is held unlikely. However, Dr. Carl Sagan, Miller research fellow of the University of California, Berkeley, Calif., performed simulated atmospheric studies showing that simple organic molecules are produced in the atmosphere of Jupiter by the action of ultraviolet light from the sun and atmospheric electrical discharges.

As visible light penetrates through the clouds of ammonia in Jupiter's atmosphere, it is absorbed by the surface and emits infrared radiation that cannot return into space. This situation leads to the "greenhouse effect" in which the temperatures at the surface increase because no heat can

escape. Temperatures near 70 degrees Fahrenheit may exist on the surface.

Organic molecules created at a rate of 10 pounds per square mile per year may fall into seas of water or ammonia. Here they would dissolve and create the conditions necessary for complex organic reaction under which life would be likely to arise.

Dr. Sagan said the possibility is somewhat better for life on Jupiter than on the planet Venus, where the greenhouse effect also operates. Life on Venus is not as likely because temperatures there are believed to be in excess of 600 degrees Fahrenheit.

He said that the question of existence of life on Mars is far from settled, although evidence taken as a whole suggests some life on the planet. Dr. Sagan reported his research in the journal, *Radiation Research*.

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SPACE

Orbiting "Needles" Belt

► A GLOBE-GIRDLING belt of orbiting "needles," or dipoles, scheduled to be launched as a communications experiment before the year's end, will be "barely detectable" and will not interfere with astronomical observations anywhere in the world, the Space Science Board of the National Academy of Sciences assured.

The Board released a United States Government policy statement received from Dr.

Jerome B. Wiesner, President Kennedy's special assistant for science and technology. Dr. Wiesner said no more dipoles will be put into orbit until results of the first launching, called Project West Ford, are "analyzed and evaluated." He also said "necessary safeguards" will be developed "against harmful interference with space activities or with any branch of science" before any decisions are made on follow-up

experiments.

Astronomers had expressed concern that dipole reflections might interfere with research on such astronomical phenomena as light signals from stars and radio signals from objects in the heavens.

A dipole is a tiny strip of copper wire acting as a radio antenna. Each strip is seven-tenths of an inch long and one one-thousandth of an inch in diameter.

To see if dipoles can be used as relay devices in long-range communications, the Government plans to launch 350,000,000 of them in a polar orbit to form a belt around the earth. They will be sprayed into space, about 2,000 miles out, by an ejection mechanism as the carrier satellite goes into orbit. The payload will weigh about 75 pounds.

In 60 days, the dipoles are expected to converge into a circling belt some five miles high and 24 miles thick. They will be pre-tuned to reflect radio waves at 8,000 megacycles.

If the system proves practical, later belts could make available a part of the crowded radio spectrum not now in use.

The Board emphasized that the West Ford Project is intended to be "purely experimental" and not an operational system.

The Lincoln Laboratory of the Massachusetts Institute of Technology, Cambridge, Mass., is in charge under Government auspices. The Air Force will provide the launch vehicle. An Air Force spokesman was quoted as saying that no announcement is ready on the actual launching date, probably to be "later this year," or the type of vehicle to be used.

The initial belt will be in an "essentially circular" orbit, and is expected to last "a few years." It was also described as no more hazardous to spacecraft than are micrometeorites.

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SPACE

Big Booster Engine Now Being Tested

See Front Cover

► MORE THAN 1,000,000 pounds of thrust is achieved by the F-1 rocket engine during the first public tests, seen on the cover of this week's SCIENCE NEWS LETTER.

The F-1 is the largest booster engine in the Free World and may be used in the U. S. Nova project to launch man to the moon. Three combinations using the F-1 engine are now under consideration:

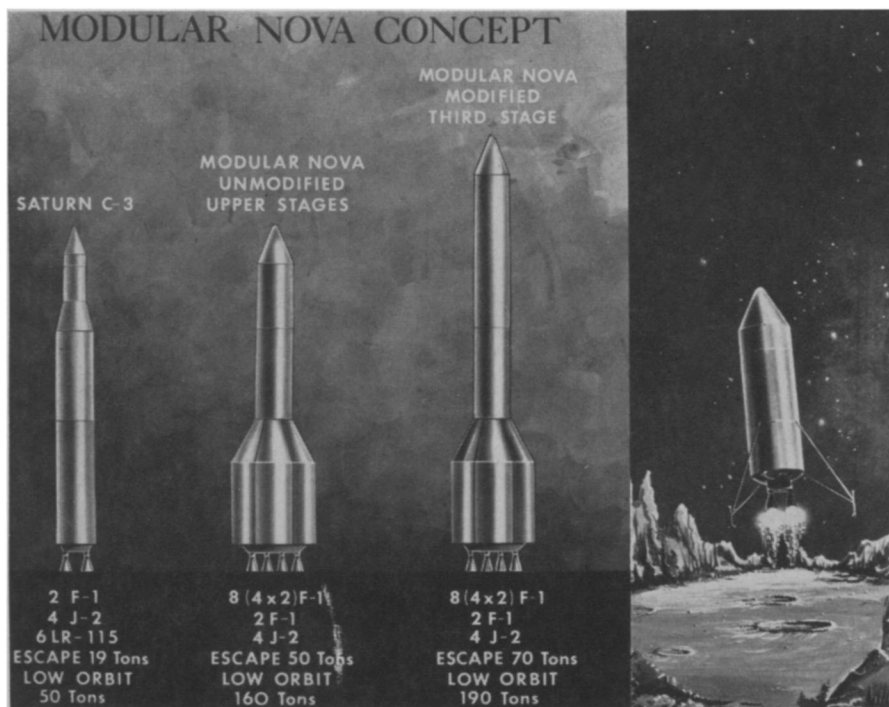
Saturn C-3 with a first stage of two F-1's having 1,500,000 pounds thrust each, a second stage of four 200,000-pound thrust J-2 engines and a third stage of six RL-10-A3 engines with 15,000 pounds thrust each.

A Nova rocket consisting of a first stage with eight F-1's, a second stage of two F-1's and a third stage of four J-2's.

A similar Nova rocket with the third stage lengthened to hold more fuel, increasing escape payload capability to 70 tons, or enough to land three men on the moon.

The F-1 engine was developed by Rocketdyne, a division of North American Aviation, Inc., Canoga Park, Calif.

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REACHING FOR THE MOON—Three combinations in which the F-1 liquid fuel rocket engine may be used for flights to the moon. At right is a hypothetical Nova-launched spacecraft near the moon's surface.