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The Editor is really sorry for any trouble he may have caused the swell people at *The Seer*. You guys are my best friends, right? Aren't you? Well, anyway, in case anyone's curious, Margot and Cynthia now have all the men they can handle, so quit phoning 667-3260.

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YORKSCIENCE

Jovian encounters

Richard Dubinsky

While York students have been probing the galaxies in movie theatres, enjoying *Star Trek* or *The Empire Strikes Back*, York scientists have been having some *Close Encounters* of their own.

Jupiter and its satellites, space travel, explorations and life in outer space are all being investigated.

NASA's Voyager mission is just one area where York scientists have made their contribution to our understanding of the cosmos.

Voyager was designed to fly by Jupiter and examine its atmosphere and satellites.

Dr. John McConnell of York's Centre for Research in Experimental Space Science has been involved with the Voyager programme for the past nine years. During sabbatical leave in Tucson, Arizona last year, Dr. McConnell assisted in the study of data obtained from the Voyager 1 and 2 spacecraft, as they flew past Jupiter.

Voyagers 1 and 2 are nuclear powered spacecraft launched in 1977 and designed to gather planetary information: the first encounter with the Jovian planetary system, 645,000,000 kilometres away from earth was in March 1980. Close up pictures and experiments have confirmed that Jupiter is composed mainly of gaseous hydrogen and helium. Trace amounts of organic gases have also been discovered as a result of this mission. The exceptional quality of the

photographs produced of Jupiter and its moons has given us the closest and clearest view to date.

The most prominent Jovian feature, the red spot, thought to be either a giant imbedded meteor (Taylor's Column) or a single wave bump called a soliton, appears to be our solar system's greatest atmospheric storm, twice the size of the earth.

Temperatures on Jupiter are extreme, ranging from -100 to over 1000 degrees centigrade. Auroral lights brighter than any northern lights seen on earth and lightning bolts comparable with super bolts seen near cloud tops above earth were photographed by Voyager 1 for the first time last spring.

"One of the more interesting observations is 'Io' or the 'pizza satellite' explains Dr. McConnell. 'Io' is one of Jupiter's satellites which was first observe by Galileo in 1610. The recent television photographs of 'Io' show vivid orange, black and white colouring due to sulfur rich materials. There is a tremendous amount of volcanic activity on this satellite which was totally unexpected, because of the cold surface temperature (-150 degrees). This is explained by internal friction as a result of its orbit around Jupiter. "Something similar to the earth's tidal action or the repeated stretching of a rubber band, causes the temperature increase that leads to the volcanic eruptions on 'Io', according to McConnell. Io is

continually spewing off particles and gases composed of sulfure, oxygen, and trace elements such as sodium and potassium. However, due to the gravitational field of Jupiter they do not escape but are ionized and form a plasma ring around the planet, first photographed by Voyager 1.

The brightest satellite of Jupiter is Europa, which is approximately the same size and density as our moon. The surface is a complex system of streaks and fissures typically 5 kilometres to 10 kilometres wide, and 100 kilometres long, which suggest a thin ice crust covering water of slush. The planet is thought to be warm due to a combination of radioactive and tidal heating similar to that found on 'Io'.

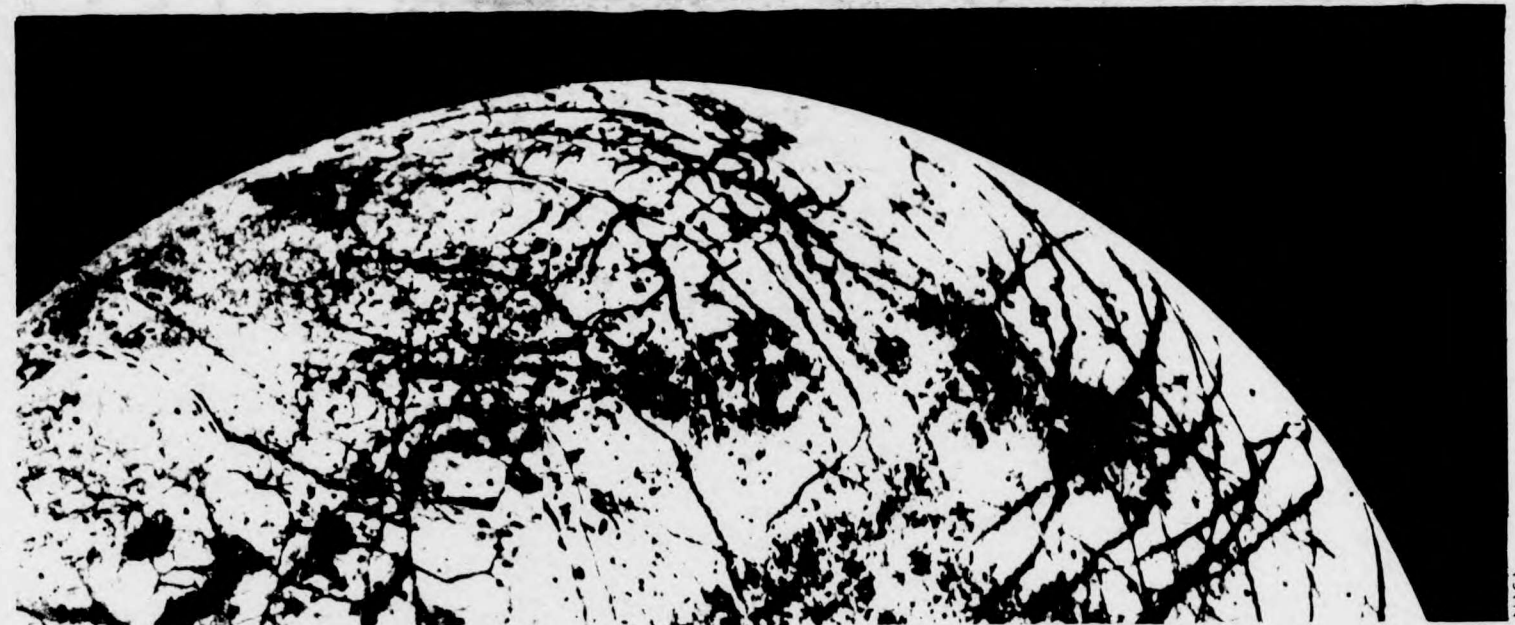
The other satellites orbiting Jupiter are: Amalthea, Gany-mede and Callisto. Amalthea is the innermost and smallest satellite, having a dark and red surface. Callisto and Gannymede are Joviters' largest satellites, composed mainly of water or ice and rock. The surfaces are variable, having grooved structures, numerous craters, and various fault lines. All these satellites are located in the inner regions of the magnetosphere, which is perhaps the largest structure in the solar system. The magnetosphere is a large disk 4.8 million kilometers in diameter composed mainly of sulfur and oxygen coming from 'Io'.

It has been suggested that Jupiter could have an environment capable of supporting

extra-terrestrial life; however, Dr. McConnell does not agree. Since there is no surface, as such, on Jupiter, life forms would have to exist in some 'niche' in the planet, but it is unlikely that it would remain in one spot. Due to the continuous overturning of Jupiter's atmosphere. This would make it very difficult for life to exist since the life forms would be exposed to extremes of hot and cold.

A more interesting possibility would be life on Titan, a large satellite of Saturn. Titan is known to have large amounts of methane which is often identified with life forms. This satellite also has a surface. Voyager's mission will continue to Saturn and pass Titan. Unfortunately, due to the distances involved, this mission will not decide on the possibility of life "unless someone jumps up and waves their hand at us..." explains Dr. McConnell.

Dr. McConnell is continually working on space exploration and data collected by the Voyager Mission. Close-up photos of Saturn and Uranus will contribute new and more detailed information of our solar system. The present state of the space program remains in a down swing although there is some serious interest in moon mining, astronomy and military surveillance. Much of the future impetus on the space program rests with the space shuttle advances.



Cracked ice on Europa, the brightest of Jupiter's Galilean satellites.

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