

ASTRONEWS

Life on Europa?

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The notion of life has always fascinated curious minds. From prehistoric days, fancy voyages to other colonies and visits from non-earthly beings have been creatively imagined. Apart from science fictions, the last few centuries saw many observational investigations of "cities of Moon", "colonies of Mars" and so on. However, the sophisticated tools of the modern era quickly put a full stop to these developments revealing that the other planets are not hospitable, and infact hostile for a life form like ours to exist there. That explains why in the last few decades the efforts shifted to observing the satellites of large planets. The anxiety grew with the knowledge of their atmospheric structure, chemical composition and volcanic activity. Detection of water, albeit frozen, was a welcome surprise. The flyby of Voyager and Pioneer provided ample evidence for the presence of water, one of the most important ingredients for the germination of the seed of life.

The detection of the fossil of a microorganism on a stone believed to have fallen from Mars, boosted the scientists zeal to pursue the research, although the date for life on Mars (more than 3 billion years ago) is not very convincing.

Last year, many scientists, from different branches like astrophysics, geology, oceanography, biology and astrogeology discussed the possibilities of life elsewhere in the universe. The focal point was not Mars, but Europa, one of the Galilean satellites of Jupiter. Their studies based on Voyager images supported the possibility of liquid water beneath the frozen sheets of ice. However, heat is also an essential parameter. Europa, being at a distance five times the sun-earth separation can have only 1/25th the warmth of the earth. Then, where does it get the necessary warmth from? There are other important sources of heat in many of these satellites that lie concealed from our view. They are the volcanoes. If present, can these keep the water warm below the ice sheets?

The unmanned Galileo spacecraft has sent close up views of Europa indicating the existence of a dynamic ocean in which ice blocks seem to be drifting apart. The blocks, resembling the

icebergs on the earth, are 3 to 6 kms wide and could be almost 2 kms thick. They appear to have been formed about a million years ago. Beneath these ice blocks, perhaps lies an ocean almost 100 kms deep. These numbers imply that the quantity of water is nearly three times that on the earth. The water is also rich in salts. Can it hold life, atleast the cousins of the earthly bacteria found in the volcanic underwater terrains? Why not? That is the opinion. How do we see these bacteria? There is a proposal to send a 1.5 meter long, 15 cms diameter probe called Cryobot, which can penetrate the ice and reach the water. The experience from the exercises performed over the last couple of years with the tethered satellites will come handy now. Well, we have a site on earth fresh water lake Vostok on the Antarctica, where the probe can be tested. May the probe peruse the bacteria!

(Based on press releases from NASA)