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Re: Greek Legend Becoming Fact: Charon Prime Target

From: Stig Agermose <stig.agermose@get2net.dk>
Date: Sun, 31 Jan 1999 07:56:59 GMT
Fwd Date: Mon, 01 Feb 1999 10:08:48 -0500
Subject: Re: Greek Legend Becoming Fact: Charon Prime Target

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<http://www.msnbc.com/news/233408.asp>

Stig

'Charon was supposed to be the boatman who brings life between this world and the underworld. If there is indeed life on Charon, it seems very fitting with these legends.'

DOUGLAS LIN

Lick Observatory

[Image: This is the clearest existing image of Pluto and Charon, captured by the Hubble Space Telescope. The moon, at upper right, was discovered in 1978. Before that, astronomers could not make out the satellite as separate from the planet.]

Charon: Dark horse in search for life

Could there be water and energy under ice of Pluto's moon?

By Alan Boyle

**

MSNBC - Jan. 28 - It's the most distant moon known, out where our sun is a cold point of light. But scientists say Charon, the icy satellite of the planet Pluto, ranks as a prime target in their study of the conditions that could sustain life.

Planetary scientists have a short list of worlds in our solar system that could have sustained life at some point in their development. "There have been as many as five habitable worlds," including Earth, said David Des Marais of NASA's Ames Research Center.

He said his list included Mars, which scientists believe was once warmer, wetter and Earthlike; Venus, which may have had a more hospitable climate before its atmosphere fell victim to a runaway greenhouse effect; Europa, which may have the solar system's biggest ocean of water beneath its outer shell of ice; and Charon.

Charon? The cold moon that whirls around Pluto at a distance of 3.7 billion miles (5.9 billion kilometers) from the sun? The puny world discovered only in 1978, with a mass just 0.03 percent of Earth's, with a diameter roughly equal to the distance from New York to Chicago?

Although it seems unlikely, Charon (generally pronounced like the name Karen) just might be capable of harboring life, said Douglas Lin, an astrophysicist at the Lick Observatory. The possibility was raised by data from the Hubble Space Telescope, indicating that Charon's orbit around Pluto is slightly eccentric.

Lin theorized that the orientation of Charon's orbit to Pluto's orbit introduced a wobble, analogous to the wobble of a spinning top as it starts to slow down. Whatever the cause, the eccentric orbit means both Pluto and Charon are subject to gravitational tides as they spin around each other.

The tides warp both worlds, leading to internal heating. But since Charon is 10 times less massive than Pluto, the tides create more stresses and strains within the interior of the moon.

"We estimate that the interior of Charon could be molten," Lin said. "Now, do we have any evidence to suggest this is in fact what's happening? For the time being, we don't have any information. We don't have a very good picture of what's going on."

If Charon does have a molten core, scientists say that could provide the energy source required for sustaining life. After all, there are organisms that survive around hydrothermal vents in the sunless depths of Earth's oceans, which are as dark as Charon.

Scientists also say life requires liquid water and organic materials and Lin contends that those might be present on Charon as well.

"You see plenty of organic material in comets, and comets come from the outer part of the solar system," Lin said. "There probably is no shortage of organic material in the outer solar system."

As for water, Lin noted that Charon's surface was apparently more reflective and had "a little bit more of water frost" than Pluto's surface leading scientists to speculate that the moon was covered with ice. If Charon's interior is warm enough, there may be liquid water beneath the ice, Lin theorized. And if that's the case, such waters might be suitable for life, at least on the microbial level.

"Pluto, it turns out in Greek legend, was the god of the underworld, and Charon was supposed to be the boatman who brings life between this world and the underworld," Lin mused. "If there is indeed life on Charon, it seems very fitting with these legends."

Charon and Pluto are both on the itinerary for a probe known as the Pluto-Kuiper Express, currently on the drawing boards at NASA. The space agency intends to launch the spacecraft in about 2004. It would take 10 years for the probe to fly by Pluto, and then it would continue even farther out, into a ring of ice worlds known as the Kuiper Belt. The data sent back during that flyby could answer at least some of the questions posed by Lin.

Even if Charon turns out to be barren, Lin said that each expansion to our solar system's "habitable zone" increases the odds of finding life elsewhere in the universe.

"If you took literally our old concept (of habitable zones), you would be very pessimistic indeed to think there would be the possibility of life existing anywhere in the universe," he said.

THE PROBLEM WITH PLUTO

Over the past few weeks, Pluto has been in the news because of a controversy over its classification. Some leading astronomers

said they were a bit miffed over reports that Pluto might be "demoted" from its status as a major planet.

"It's not been demoted," said Brian Marsden of the International Astronomical Union's Minor Planet Center. "That never really was the situation."

But Marsden acknowledged that the debate was confusing even for some of his scientific colleagues. Pluto facts

Average orbit: 3.7 billion miles, or 5.9 billion kilometers.

Diameter: 1,430 miles, or 2,301 kilometers.

Length of day: 6 Earth days, 9 hours.

Length of year: 248 Earth years.

One known satellite, named Charon.

Ever since Pluto was discovered in 1930, astronomers have acknowledged that it was a breed apart: Pluto is less than half the size of any other planet. Its orbit is much more inclined and eccentric than those of the other eight. In fact, for the past 20 years it's been closer to the sun than Neptune but will reclaim its title as the farthest planet next month.

"We've known for a long time that Pluto didn't fit," said University of Maryland astronomer Mike A'Hearn, who heads the Planetary Systems Sciences Division of the International Astronomical Union.

The dilemma deepened in 1992 when astronomers discovered other objects similar to Pluto, balls of ice on the fringes of the solar system that have been dubbed Trans-Neptunian Objects. More than 90 such objects have been identified, and although none of them is as big as Pluto, their existence led A'Hearn and his colleagues to wonder about changing Pluto's classification.

"There is no doubt that Pluto is a Trans-Neptunian Object, all the experts agree that dynamically that's what it is," A'Hearn said.

That led to the next question: Should Trans-Neptunian Objects be classified formally as minor planets, a category that also includes asteroids such as Ceres, Vesta and Eros? If so, shouldn't Pluto be lumped in with the others of its ilk?

A'Hearn canvassed other astronomers by e-mail, hoping that the deliberations would result in a formal decision by the International Astronomical Union. But so far there has been no consensus on whether Pluto should be put on the list or excluded.

Marsden said he favored giving Pluto "dual status": It would continue to be recognized as one of the nine major planets, and also take a place of honor among Trans-Neptunian Objects as the 10,000th minor planet.

He acknowledged that "there have been movements afoot to try and not do this." But he said it was important to come up with a classification system that made sense.

"We've reached the state where (Trans-Neptunian Objects) need to have a permanentization of their status. ... If we're going to start doing that, the whole point is that if you exclude Pluto from consideration in the same sense, it looks rather funny," Marsden said. "You can understand astronomers saying 50 years from now, 'Well, that looks pretty stupid.'"

Astronomers on both sides of the debate said the controversy was ultimately about the definition of planethood. Is that definition dependent on mass, or shape, or the way it behaves in a solar system? Depending on the criteria, our solar system could contain eight, 10 or even more planets.

"There has just never been a need to make that definition in the past," A'Hearn said.

He said the fact that scientists were rethinking Pluto's status was a healthy sign.

"I view this as an opportunity to show the public that the whole point of studying the solar system is to explain how it came into being, and as we do that we uncover things that lead us to have to rethink some of these issues," he said. "If we're never revisiting some of these issues, that's a good indicator that our knowledge is not advancing."

*IAU Planetary Systems Sciences: Pluto
*Pluto-Kuiper Express
*Pluto, the Ninth Planet
*The Nine Planets
*Views of the Solar System
*Planetary Photojournal
*Your Weight on Other Planets
*Planet or Trans-Neptunian Object? Discuss it on the Space News BBS

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Should Pluto's status as a major planet be changed?

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