Great Debates

Lonely Blue Marble?

Main Menu
- Home
- Subscribe
- Archive
- Random Page
- All Topics
- Europe

Features
- Great Debates
- Table Talk
- Expeditions
- Perspectives
- Chronicles
- Editions
- Calendar
- Espanol

Hot Topics
- Titan
- Europa
- Moon to Mars
- Terrestrial Origins
- Climate
- Extreme Life
- Mars Life
- Outer Planets
- Meteors & Comets
- New Planets
- Extrasolar Life

Francis Crick Remembered

Summary (Jul 30, 2004): The British molecular biologist Francis Harry Crick died on Wednesday at the age of 88. Crick won the Nobel Prize for the co-discovery of a double helical structure for all our DNA. Crick also studied the origin of life, which he considered to be that life arrived on Earth from somewhere else in our solar system.

Display Options:

Francis Crick Remembered

Life on a Meteor Ride

The British molecular biologist Francis Harry Crick died on Wednesday at the age of 88. Crick changed our understanding of life when, in 1953, he and James Watson announced that DNA came packaged in an elegant double helix structure. Crick reportedly claimed they had found 'the secret of life,' and many scientists agree. The double-helix structure explained how genetic material replicated through nitrogenous base pair bonds. Some see this as the most important development in biology in the 20th century, and Watson and Crick were awarded the Nobel Prize in Medicine for their discovery in 1962.

Artist's depiction of the Chicxulub impact crater. The total number of objects a kilometer in diameter or larger, a size that could cause global catastrophe upon Earth impact, is now estimated to range between 900 and 1,230.
Credit: NASA

Crick was not content to sit back on his laurels after winning one of the top prizes in science, however. He continued to study the mysteries of life, such as the nature of consciousness, or the possibility that RNA preceded the development of DNA. In 1973, he and the chemist Leslie Orgel published a paper in the journal Icarus suggesting that life may have arrived on Earth through a process called 'Directed Panspermia.'

- Stellar Evolution

Image Galleries
- Studio
- Panoramas
- Terrafirma Now

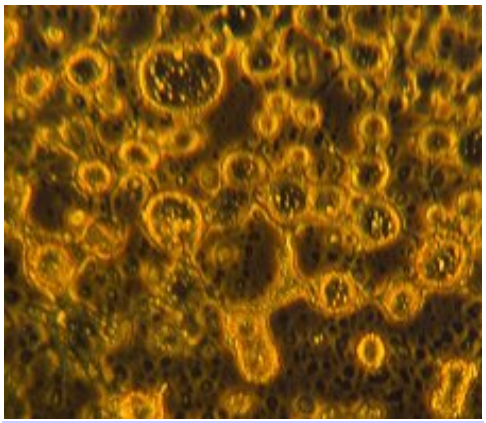
Find-It
- Monthlies
- Advanced Search
- Multimedia Search
- Syndication
- Spread the Word
- About

Ephemerids
On this day in...

1962
First international satellite launch - Vandenberg

- see Great Impact Debate Part 1 * Part 2 * Part 3 * Part 4 * Part 5

The Panspermia hypothesis suggests that the seeds of life are common in the universe and can be spread between worlds. This idea originated with the Greek philosopher Anaxagoras, and was later promoted by the Swedish physicist Svante Arrhenius and the British astronomer Fred Hoyle. Versions of this hypothesis have survived to the present day, with the discovery of proposed 'fossil structures' in the martian meteorite ALH84001.



In a related project conducted by members of NASA's Astrobiology Institute, scientists have created primitive organic cell-like structures. They did it in their laboratory by duplicating the harsh conditions of cold interstellar space! Did comets carry such protocells to Earth?

'Directed Panspermia' suggests that life may be distributed by an advanced extraterrestrial civilization. Crick and Orgel argued that DNA encapsulated within small grains could be fired in all directions by such a civilization in order to spread life within the universe. Their abstract in the 1973 Icarus paper reads:

"It now seems unlikely that extraterrestrial living organisms could have reached the earth either as spores driven by the radiation pressure from another star or as living organisms imbedded in a meteorite. As an alternative to these nineteenth-century mechanisms, we have considered Directed Panspermia, the theory that organisms were deliberately transmitted to the earth by intelligent beings on another planet. We conclude that it is possible that life reached the earth in this way, but that the scientific evidence is inadequate at the present time to say anything about the probability. We draw attention to the kinds of evidence that might throw additional light on the topic."

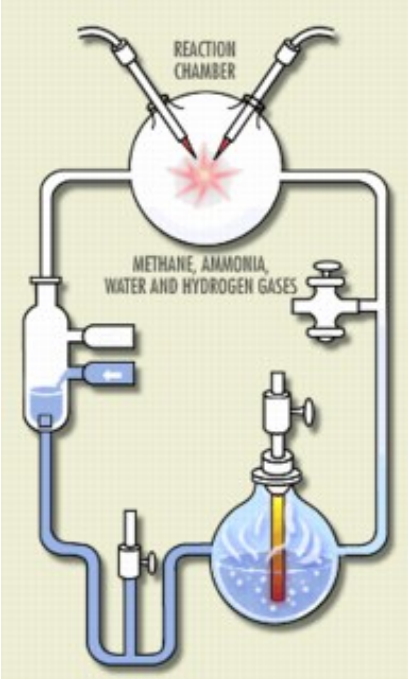
Crick and Orgel further expanded on this idea in their 1981 book, 'Life Itself.'. They believed there was little chance that microorganisms could be transported between planets and across interstellar distances by random accident. But a technological civilization could direct panspermia by stocking a spacecraft with a genetic starter kit. They suggested that a large sample of different microorganisms with minimal nutritional needs could survive the long journey between worlds.

Many scientists are critical of the Panspermia hypothesis, because it does not try to answer the question of how life first originated. Instead, it passes the responsibility on to another place and another time, offering at best a partial solution to the question.

Crick and Orgel suggested that Directed Panspermia might help resolve some mysteries about life's biochemistry. For instance, it could be the reason why the biological systems of Earth are dependent on molybdenum, when the chemically similar metals chromium and nickel are far more abundant. They suggested that the seeds for life on Earth could have originated from a location far richer in molybdenum.

Other scientists have noted, however, that in seawater molybdenum is more abundant than either chromium or nickel.

Coming full circle to his groundbreaking discovery of



The Miller-Urey experiment generated electric sparks -- meant to model lightning -- in a mixture of gases thought to resemble Earth's early atmosphere.
Credit: AccessExcellence.org

DNA's structure, Crick wondered, if life began in the great "primeval soup" suggested by the Miller/Urey experiment, why there wouldn't be a multitude of genetic materials among the different life forms. Instead, all life on Earth shares the same basic DNA structure.

Crick and Orgel wrote in their book 'Life Itself,' "an honest man, armed with all the knowledge available to us now, could only state that in some sense, the origin of life appears at the moment to be almost a miracle, so many are the conditions which would have had to have been satisfied to get it going."

Related Web Pages

A Visit with Francis Crick
Expanding the Genetic Code
Titan in a Test Tube
Predicting Primordial Weather
Primordial Recipe: Spark and Stir
Dinner with Darwin
Miller's 1953 Science paper [PDF 800 kB]
Terrestrial Origins
Entropy and Evolution
What is Life?
Miller-Urey Experiment: Amino Acids from Scratch
The Envelope of Life? Please
Defining Life

Note: *Missions*

Display Options:

Friday, July 30, 2004