



WHAT IF... WE CAME FROM SPACE?

HOW did life begin? Charles Darwin speculated that it happened in "some warm little pond". Since then, many other possible crucibles have been identified: deep underground, in the open ocean, by hydrothermal vents on the ocean floor, on a radioactive beach and on the surface of a lump of clay. The hypotheses have little in common except for one thing: they take it for granted that Earth's life must have arisen at home.

What if it didn't? In the early 1970s, astronomers discovered that space was full of complex organic molecules, some of them forming part of the comets and meteorites that occasionally crash-land on Earth. Life also seems to have arisen here with improbable haste. Almost as soon as it was habitable, Earth became inhabited. Could the transition from prebiotic to biotic chemistry really have happened so fast?

The observations reignited an alternative account of how life began, first proposed in 1871. Panspermia holds that life got going somewhere else - perhaps on Mars, perhaps further afield - and was carried to Earth on a comet or meteorite.

The idea remains an unproven hypothesis on the fringes of mainstream science. But the tide is turning, according to Chandra Wickramasinghe of the University of Buckingham, UK, one of the scientists who revived panspermia in the 1970s, along with Fred Hoyle. "This was conjecture in the past, purely theoretical, but now we have evidence for it," he says (see box, right). "It's changing, slowly but surely."

According to Wickramasinghe, the galaxy is teeming with life, and our biosphere is just part of a vast, interconnected cosmic ecosystem. Genetic material and even living

organisms are constantly exchanged between Earth and neighbouring star systems. Evolutionary change is largely driven by novel genetic material arriving from space, most likely in the form of viruses.

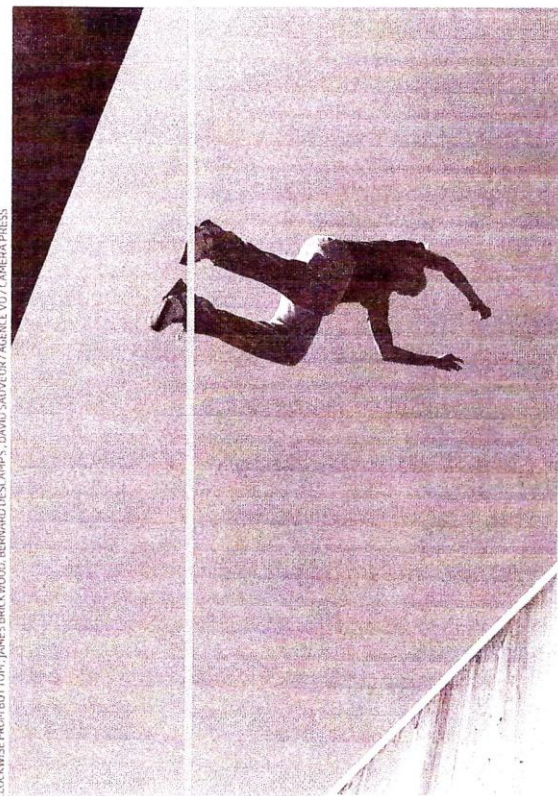
Others are a little less ambitious, arguing merely that life first evolved on Mars. "I think the case for Mars as the origin of Earth life is pretty good," says Peter Ward, a biologist at the University of Washington in Seattle.

Nonetheless, confirming that our distant ancestors were extraterrestrials would have a profound effect. "It would mean a re-evaluation of biological dogma," says Wickramasinghe. "Darwinian evolution is not a closed box. We have to regard evolution on our planet as the expression of something that has taken place over a vast region of space."

Socially, the biggest effect would probably be on religion. "It's a big blow," says Ward. "For some religious fundamentalists, it is an axiom that there is but one life and it is here on Earth." Wickramasinghe agrees that religions will be troubled, but not for long. "My guess is that leaders would be able to incorporate it into their existing theology - they've always been remarkably adaptable in taking on new developments."

Wider society would follow suit - and the effects could be positive. "Undoubtedly there would be resistance and denial," says Wickramasinghe. "Humans are very conservative. But ultimately, we'd come to think of ourselves not as terrestrial creatures, but as creatures of the cosmos. And the sympathy that we now feel for things that are happening across the planet would extend on a cosmic scale."

Graham Lawton



CLOCKWISE FROM BOTTOM: JAMES BRINKWOOD; BERNARD DESKAMP; DAVID SANFORD / AGENCY FOR CAMERA PRESS

FOUR HINTS OF PANSPERMIA

Sky-high bugs

In 2013, a balloon was flown into the stratosphere during the Perseid meteor shower. It returned with samples of microorganisms found 27 kilometres up, too high to have been lofted from Earth's surface.

Alien "fossils"

Numerous meteorites contain enigmatic structures that some have interpreted as fossilised bacteria.

Lifelike light from space

The infrared light coming from many distant astronomical objects matches the kind that biological materials would give off.

Red rain

In 2001, Kerala in India was showered with reddish rain that contained unusual cell-like structures. The rain followed a sonic boom that may have been a meteor breaking up in the atmosphere.

