

SPECIAL REPORT

Mars: Knock, knock, who's there?

LAST week a research student at our centre drew my attention to a news flash from NASA on the World-Wide-Web, announcing the possible discovery of fossilised micro-organisms in a meteorite of Martian origin. The next morning's newspapers displayed this news item prominently.

Indeed, the discovery of evidence indicating extraterrestrial life should make headlines. However, in this age when the adage 'publish or perish' has been replaced by 'publicise or perish', one should be cautious in assessing the facts beneath the hype. What is the evidence that drove NASA into ecstasies and the US president into making a special announcement?

Briefly, the story goes as follows. In 1984, Roberta Score, along with a team of scientists, was exploring the Allan Hills part of the Antarctica when she noticed an odd piece of rock that stood out against the icy surroundings. On closer examination it turned out to be a meteorite of possible Martian origin.

It is well known that Mars is hit by asteroids much more frequently than earth. Asteroids are huge pieces of rocks that move in a belt between Mars and Jupiter. When they hit Mars, the debris is hurled into space, and this potato-sized piece found in the Antarctica probably came out that way. This is estimated to have happened about 16 million years ago. This piece then began to move around within the gravitational force of the sun and the nearby planets and was caught by earth about 13,000 years ago. It was discovered in 1984. So much for history.

But the real excitement began when this meteorite, named ALH84001, was subjected to intensive

scrutiny. It showed organic molecules, in particular the polycyclic aromatic hydrocarbons (PAH) deep inside it. Although there may be other ways of explaining the origin of such a compound, the simplest is through the agency of bacteria. The carbonate globules found in the rock piece contained the largest concentration of the PAHs and these globules are known to be producible by bacteria. Further, electron microscope images show a large number of elongated forms which can be explained by micro-fossils formed by bacteria or other micro-organisms. Their size is about a thousandth of the diameter of human hair. If proved positive, this would indicate the existence of micro-life on Mars some 3.5 billion years ago.

The researchers are cautious even after working on the piece for the past two years, for the conclusion drawn is far-reaching and arguments supporting it are circumstantial and linked through a long chain. Further examination is necessary. As NASA has announced, there will be periodic flights to the red planet to explore the surface topography and carry out new tests. For example, it is believed that up to two billion years after its birth the planet was warmer and wetter and what we see today as the dried canals were once full of water. Perhaps some of it still exists underground and may help the breeding of primitive life forms.

The Viking I and II spacecrafts carried out such tests in 1976-77. The negative conclusion arrived at by two experiments looking for existence of micro-organisms in Martian soil was publicised. Later, the reliability of those experiments was called into question and there has been still some un-

Is there anyone out there, or are we home alone in the universe? This question has teased and haunted humankind through the ages. The recent findings which to some suggest that there may have been life forms on Mars have once again sparked off widespread interest and speculation on the cosmic riddle. Though the evidence unearthed is far from conclusive, the Alien has once again captured our imagination, provoking a welter of hopes and fears, zany humour and outlandish hoaxes.

This report outlines what the possibility of life on Mars, and beyond, has meant to us in science and art, fable and fantasy. Are the skies empty or watchful, home of predatory Alien or benign ET? We might never find the answer to what is out there. But in asking the question, we could begin to unravel the equally great mystery of what lies within, compelling us to invent the heavens in our own reflected image.

By J. V. Narlikar

certainty about the existence or otherwise of life on Mars. The ALH 84001 data will not resolve the issue because it addresses the question of existence of life 3.6 billion years ago.

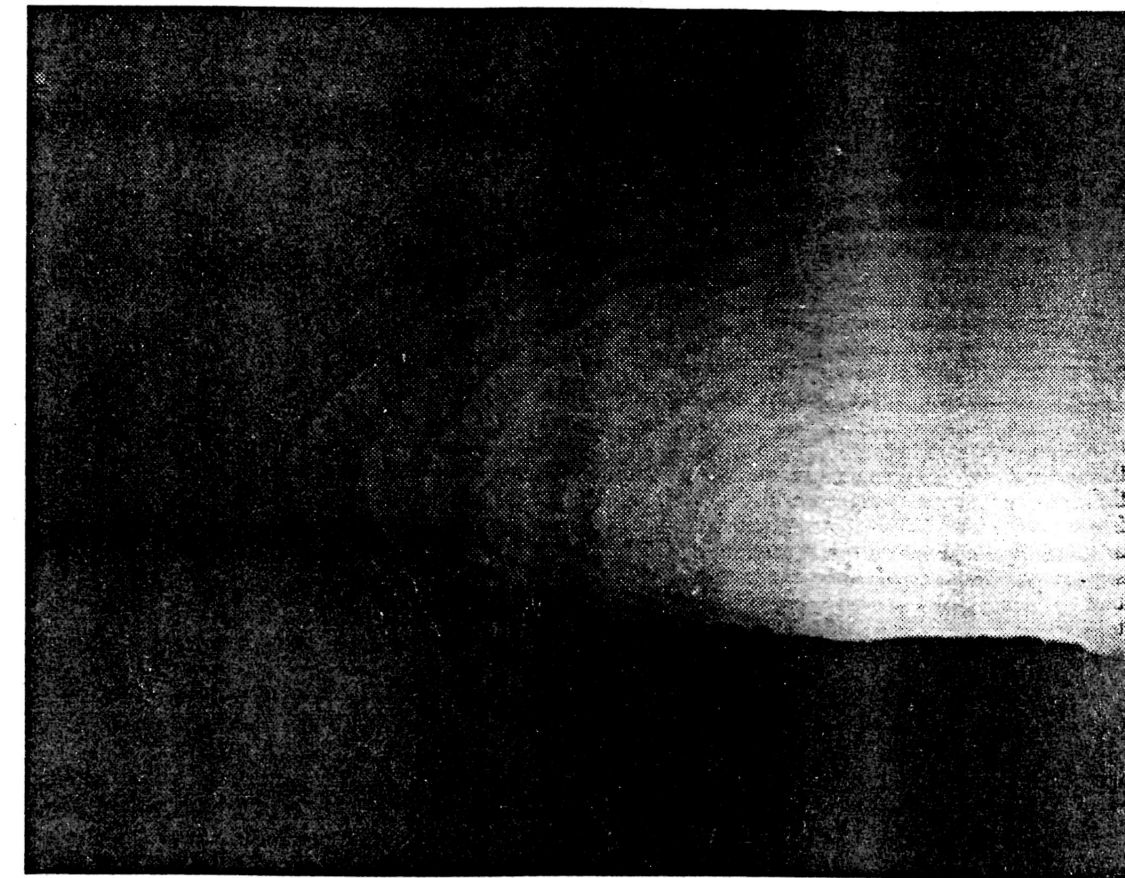
All this may also turn out to be false scent and caution is advised. Apart from the objective assessment of data, the idea of extraterrestrial life faces a cultural barrier even among scientists. Astronomers were cured of anthropocentric myopia gradually, but it took them centuries. However, for some reasons, which I as an as-

tronomer cannot understand, the biologists seem to be hooked on the idea that life on earth can only be of terrestrial origin and could not have external inputs. Paul Davies recently argued that there might have been interaction between Earth and Mars, including the exchange of matter, some of which could contain micro-organisms. ALH 84001 would lend credence to this idea.

The theory of life forms being transported in frozen state in cometary tails or meteorites had been proposed earlier by Fred

Hoyle and Chandra Wickramasinghe. They argued that when these comets open out their tails, and if these tails brush Earth's atmosphere, these micro-organisms would be transported to Earth. These authors also argued that in this way, new diseases conveyed by viruses from outer space could start here as epidemics.

I recall attending an international meeting in Sri Lanka in 1982 where Hans Pflug from Germany presented evidence from some meteorites which pointed to the existence of ultrafine struc-



A Martian sunset: is there anybody watching?

tures ranging from 10 to 500 nanometres (one nanometre is a billionth part of a metre) which could be interpreted as carbonaceous and intrinsic to the material. The suggestion was that these rocks could also contain pristine fossils, as suggested by Hoyle and Wickramasinghe.

This idea has drawn considerable flak from biologists on the grounds that viruses or other micro-organisms would not survive in space. However, bacteria can be harder than thought and the ALH 84001 episode will open out new possibilities for ambience for primitive life forms in space and in

non-terrestrial habitats that were hitherto considered unlikely.

So, a lot hangs on the potato-sized rock recovered from the Antarctica.

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