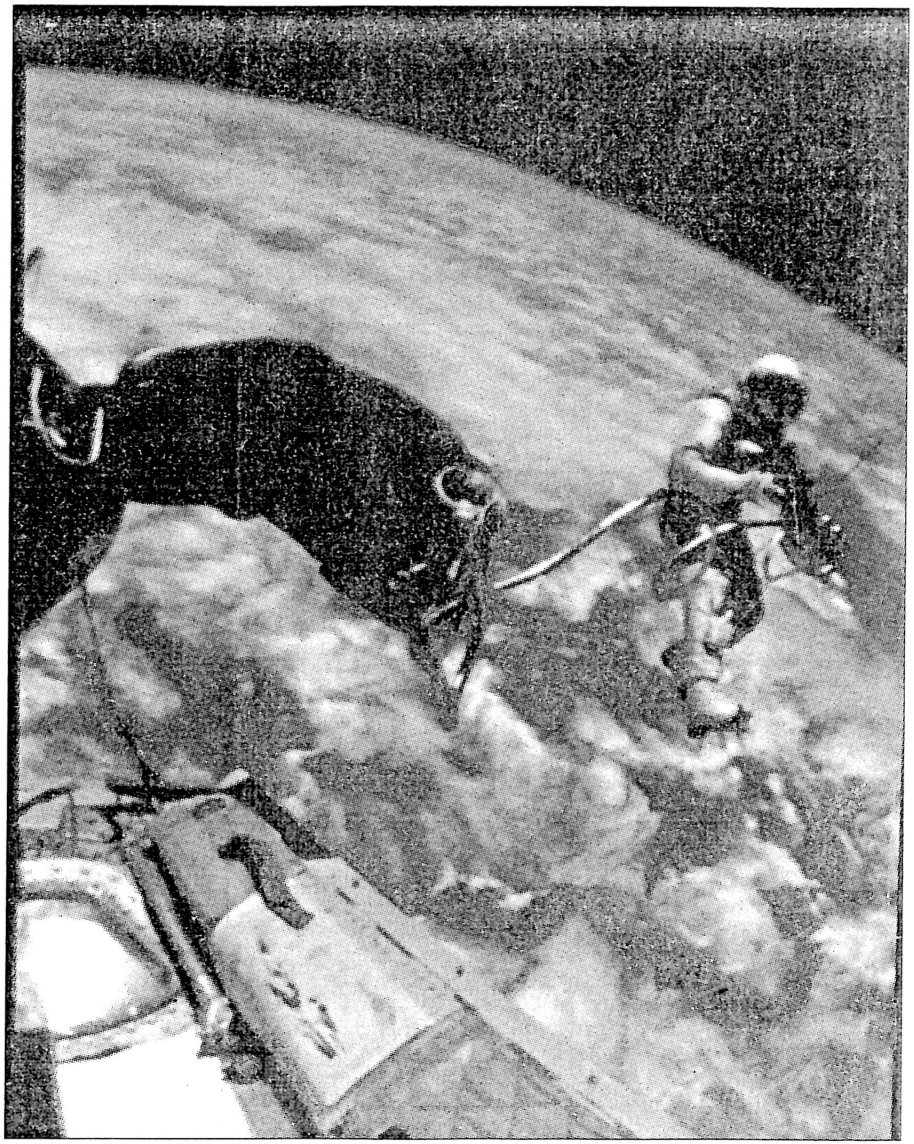
Infinite human quest

Jayant V Narlikar

When we look at the star-studded night sky we wonder how big the whole cosmos is. However, these stars that we see are but a very tiny fraction of the more than hundred billion stars that reside in our Milky Way Galaxy. The Milky Way itself is like a disc so vast that light will take a hundred thousand years to cross it. Till the early part of the last century, human ego generated a firm belief that our galaxy was the only object in the universe: Everything that the astronomer discovered through his telescopes was believed to belong to the Milky Way.

This belief was rudely shattered in the 1920s with the realisation that many of the faint nebulous patches appearing on astronomical photographs were galaxies in their own right, of size comparable to the Milky Way. And they were located at distances of millions of light years. In 1929, Edwin Hubble found that the entire framework of galaxies is expanding, with each galaxy moving apart from all others. Today, telescopes like the Hubble Space Telescope or the large ground-based telescopes like the Keck Telescope are showing us a universe even grander than this. It is made of clusters of galaxies grouped in large superclusters hundred million light years across or even larger, separated by giant voids, with the entire structure expanding in a very systematic way. Looking as far as 10 billion light years, these telescopes continue to see no end to the universal expanse. The human ego would, nevertheless not rest until the whole cosmic mystery is solved.



Human ego had generated a firm belief that our galaxy was the only object in the universe —Reuters

What caused this expansion? How did galaxies appear in their clusters and superclusters? Indeed, how did particles that comprise basic constituents of matter, first form? We see the universe bathed in a radiation background of very low temperature; what was its origin due to?

These are questions posed by today's cosmologists. They are different from those of yesteryears, of a hundred years ago when astronomy hardly reached beyond the confines of the Milky Way. Have we reached the end of the quest, or do more surprises lie beyond it? These questions and the enormity of the universe in comparison with the human habitat here on the Earth, have had a humbling influence on some of the greatest scientific brains of the 20th century.

To quote the famous Cambridge cosmologist A S Eddington:

"Man in his search for knowledge of the universe is like a potato bug in a potato in the hold of a ship trying to fathom from the ship's motion the nature of the vast sea...."

Eddington said this as scientists were coming to terms with the observed fact that the universe is expanding. Four decades later, Eddington's successor at Cambridge, Fred Hoyle, another distinguished cosmologist, had this to say:

"...I think it is very unlikely that a creature evolving on this planet, the human being is likely to possess a brain that is fully capable of understanding physics in its totality. I think this is inherently improbable in the first place, but even if it should be so, it is surely wildly improbable that this situation should just have been reached in the year 1970...."

Indeed, cosmologists in the 1970s often claimed that they had solved the problem of the origin of the universe. Most of those ideas are defunct today, to be replaced by new ones.

There is a lesson here for today's cosmologists to be more cautious about their claims. They need to introspect: How much of what they claim is fact and how much speculation. In these days of media-based publicity, the caution and humility displayed by Eddington and Hoyle are in short supply.

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