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The Extraterrestrial Adaptation

An anthropological and archaeological perspective on human space exploration

by Cameron McPherson Smith and Evan Tyler Davies

Human space exploration is sometimes characterised by critics as a technocratic, machine-centred endeavour. From an anthropological and archaeological perspective, however, it is a natural continuation of humanity's history of adaptation to new environments. While many of these adaptations have been possible only with technological innovations, they have never been 'about' technology: they have been about people finding new places to live.

Human evolution and adaptation

The story of human evolution is one of biological and cultural change through time. Anthropology and archaeology have revealed that our recent pre-history is a hair-raising odyssey of adaptation to new habitats.

An adaptation is a thing or process that allows life in an otherwise hostile environment, such as a new form of beak or a pressure suit. Human evolution is characterised by both biological and cultural adaptations; three are particularly important.

The Terrestrial Adaptation occurred roughly five million years ago, when our ancestors became habitual bipeds. The Technological Adaptation began roughly 2.5 million years ago, when we began to rely more on tools than biology for our adaptations (eg stone tools rather than sharper teeth). The Cognitive Adaptation occurred around 100,000 years ago, with the advent of symbolism, ultimately leading to language, farming and civilization.

These basic adaptations allowed our ancestors to move beyond Africa and flourish in regions that were previously uninhabitable.

The most important forthcoming adaptation will be the Extraterrestrial Adaptation, the movement of humans into space colonies where viable populations can exist biologically independent of Earth populations.

In discussing the value of human space exploration, we've found it useful to point out that while technology has been key to human adaptation for millennia, human adaptation is not about technology; it is, ultimately, about humanity finding new places to live.

Colonisation of the Pacific

Roughly 3000 years ago, people began expanding from southeast Asia into the Pacific. By 1200 years ago, they reached the Hawaiian Islands, Easter Island and New Zealand.

This expansion was not the result of accidental drift voyages, but purposive exploration: people wanted new land, and they travelled equipped to colonise it, carrying seed stocks, chickens, pigs, dogs, and plants. Critical to their success was the invention of double-hulled voyaging canoes and naked-eye astronomical navigation.

One of the most striking adaptations was kavenga, or starpath navigation. The method was based on detailed knowledge of the rising and setting azimuths of certain stars, their transit arcs, and their transit periods, in certain latitudes and seasons. Kavenga allowed Polynesians to navigate the Pacific as skilfully as the early European explorers.

Without sea-going canoes and some form of astronomical navigation, Oceania could not have been colonised 2000 years ago. That colonisation was never about canoes or star azimuths, it was about people looking for new land.

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The authors, both Fellows at the Royal Geographical Society (London), and the Explorers Club (New York), are writing Distant Lands Unknown, a book on the future of humanity in space.

North American Arctic

About 1500 years ago, a similarly-purposive expansion of humans is known from a vastly different environment, the North American Arctic. In a few centuries, the 'Thule' people spread from Alaska to Greenland, traversing the sea ice and tundra of the Canadian Arctic.

This expansion was also dependent on technological adaptations, including new watercraft, dog sleds, snow goggles (sculpted from bone), and the igloo. Colonisation of the Arctic was as technically intensive as that of the Pacific, with high equipment performance demands and severe penalties for equipment failure.

The Arctic adaptation was dependent on the invention of novel technologies, but it was not a soul-less, tool-centred, technocratic endeavour, focused on those technologies: it was an adaptive endeavour about people finding new places to live.

Human space exploration

From an anthropological perspective, human space exploration is no more 'about' rockets and machinery than colonisation of the Pacific was 'about' ocean-going canoes and star-path navigation, or the colonisation of the Arctic was 'about' dog-sleds and igloos. It is about finding new places to live.

Humanity has been looking for new places to live, and adapting to them, for over five million years. Why should that exploration cease at the curve of the Earth, or our very nearby Moon? It is a fact that species and genera of life have arisen and been extinguished in the 4.5 billion years of Earth life. It is an archaic, foolish conceit to think that humanity must be safe 'here at home'. Geologists document ancient extinction events, and astronomers warn that others will occur. And weapons of mass destruction raise the horrible possibility of a new Dark Age, or even the extermination of our species.

The long-term survival of Homo sapiens sapiens requires establishing successful extraterrestrial populations. The only way out is up: the Extraterrestrial Adaptation. To ensure the success of this next adaptation, space-colonisation advocates and planners should learn as much as possible about the principles of evolution and adaptation.

One-page Into Space articles offer readers the opportunity to express their ideas and 'think aloud' on space topics which they see as important and of interest to others. Contributions of an appropriate (one-page) length may be sent to the editor at any time and should be accompanied with a photo of the writer (head and shoulders) and a few lines of personal details.