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*Pushing Human Frontiers—Robert Zubrin*



*An artist's conception of two habitats that a crew would connect while exploring Mars. This image was produced for NASA by John Frassanito and Associates. NASA Image S93-45581.*

Dr. Tyson offered a very interesting set of ideas. I agree with some of the points he made and disagree with others. But I'm here to talk not about how we're going to mobilize the political or technological forces to get us into space, but rather why we need to do it.

I'm going to start out with a quote by a very eminent historian. Frederick Jackson Turner gave a presentation entitled "The Significance of the Frontier in American History" at the annual meeting of the American Historical Association. Incidentally, this was three years after the frontier was declared closed in the American census of 1890. He was looking backwards on 400 years of European presence in the Americas. Turner wrote:

To the frontier, the American intellect owes its striking characteristics. That coarseness of strength combined with the acuteness and inquisitiveness; that practical, inventive turn of mind, quick to find expedients; that masterful grasp of material things, lacking in the artistic but powerful to effect great ends; that nervous buoyancy, the energy, the dominant individualism, working for good and evil, and withal that buoyancy and exuberance which comes with freedom—these are the traits of the frontier, or traits called out elsewhere because of the existence of the frontier. Since the days when the fleets of Columbus sailed into the waters of the New World, America has been another name for opportunity, and the people of the United States have taken their tone from the

incessant expansion, which has not only been open but has even been forced upon them. He would be a rash prophet who should assert that the expansive character of American life has now entirely ceased. Movement has been its dominant fact, and, unless this training has no effect upon a people, the American energy will continually demand a wider field for its exercise. But never again will such gifts of free land offer themselves. For a moment, at the frontier, the bonds of custom are broken and unrestraint is triumphant. There is not *tabula rasa*. The stubborn American environment is there with its imperial summons to accept its conditions; the inherited ways of doing things are also there; and yet, in spite of environment, and in spite of custom, each frontier did indeed furnish a new opportunity, a gate of escape from the bondage of the past; and freshness, and confidence, and scorn of older society, impatience of its restraints and its ideas, and indifference to its lessons have accompanied the frontier. What the Mediterranean Sea was to the Greeks, breaking the bond of custom, offering new experiences, calling out new institutions and activities, that, and more, the ever-retreating frontier has been to the United States directly, and to the nations of Europe more remotely. And now, four centuries from the discovery of America, at the end of a hundred years of life under

the Constitution, the frontier has gone, and with its going has closed the first period of American history.<sup>1</sup>

So Turner's basic point was that the fundamental American character, our philosophical outlook, and our forums and institutions were all based upon the existence of the open frontier. He documented this at great length in his book and also the fact that many of the key issues in the growth of America and the key turning points all hinged on the frontier.

The question that he raised explicitly regarding the end of the frontier was what happens to America and all it stood for? Can a free, innovating society be preserved in the absence of room to grow? Turner predicted a growing bureaucratization of American society, increased hostility to immigrants, increased skepticism on the idea of progress, and a decrease of the ability of both institutions and individuals to take on risk, and other associated social phenomena. With respect to the issue of bureaucratization, he seems to have been on the mark.

If we want to have the kind of freedom that Americans had prior to the closing of the frontier, a new frontier is required. Now one could discuss where such a new frontier might be—Antarctica, the oceans, the Moon, asteroids, or orbiting space colonies. At this stage of human history, I do not believe that any terrestrial environment can afford the function that a true open frontier did in the

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1. Frederick Jackson Turner, *The Frontier in American History* (New York: Holt, Rinehart, and Winston, 1947, 1962), pp. 37–38.

past. Simply put, wherever you are on Earth right now, you are within convenient range of communication and transportation technology. There is no new place on Earth where a new branch of human civilization can actually develop. Another way to understand this is if the American Revolution had happened today as opposed to 1776, the colonists would have lost. The colonists only were able to break away from Britain and go their own way because of the extreme logistical difficulties associated with maintaining control across transoceanic distances in the eighteenth century, because the British clearly outnumbered us.

So if you want to create a truly new and independent branch of human civilization that can experiment in new forms of existence and go its own way, it does have to be in space. Without going into detail, I believe that of all the places within reach of our technology, Mars is by far the best prospect because it is the planet that has all the resources needed to support life and, therefore, potentially civilization. By contrast, the Moon does not have these resources. Mars has got what it takes. It is far enough away to free its colonists from intellectual legal and cultural domination of the old world and rich enough in resources to give birth to a new civilization.

Now why do we need to go to Mars? Why do we need, more generally speaking, a new frontier in space? I believe the fundamental historical reason is because Western humanist culture will be wiped out if the frontier remains closed. Now what do I mean by “humanist culture?” I mean a society that has a fundamental set of ethics in which human life and human rights are held precious beyond price. That set of philosophical notions

existed in what was to become Western civilization since the time of the Greeks, the immortality and divine nature of the soul as popularized by Christianity, but it never became effective as the basis for ordering society until the blossoming of Christendom into Western civilization as a result of the age of discovery.

The problem with Christianity, despite its very interesting philosophical notions, was that it was fixed. All the resources were owned. Basically, it was like a play where the script had been written, and the parts had been assigned. There were the lead players, the bit players, the chorus, and there was no place for someone without a place. The new world changed that by supplying a place in which there were no established ruling institutions—a theater with no parts assigned. The new world allowed for the development of diversity by allowing escape from those institutions that were enforcing uniformity.

There are many problems that face us before humans can actually land on Mars, but there is fundamentally no comparison with our situation forty years ago. We are much better prepared



*An artist's conception of a vehicle to help humans explore Mars. This image was produced for NASA by John Frassanito and Associates.  
NASA Image S93-050645.*

today to launch humans to Mars than we were to launch humans to the Moon in 1961. We are better prepared technologically, scientifically, and financially. We have no credible military opponent who commands our resources. It is true that the fact that we had a military opponent did put a little drumbeat on things, but, from a material point of view, we are certainly better prepared in every respect.

Let us talk about what the twentieth century might look like without a Martian frontier. For one thing, I think we would be looking at declining human diversity. Global communications and jet aircraft are linking the world together very intimately, and so cultural diversity will, of necessity, decline. In biology, an animal type is considered strong if it has many diverse components, and I think it's ultimately a weakening of human society that we are faced with losing diversity. However, the same generic level of technology, which is making impossible the maintenance of diversity on one planet, has now opened up the prospect whereby new and more profound levels of diversity can establish the expansion of new branches of human society on other planets.

I also believe that without a new frontier in space, we face the risk of technological stagnation. The B-52 airplane is emblematic of technological stagnation. The B-52 went into service half a century ago, and it is still in service. It would have been inconceivable to any of the pilots flying the first B-52s that their grandchildren serving in the United States Air Force would be flying the same aircraft. Technological progress has actually slowed down in the last portion of the twentieth century. There

has been obvious progress in certain fields such as computers and electronics. But if you look at society overall, in the first third of the century, we went from the horse and buggy world to a world of automobiles, telephones, electrification, and radio. Aviation went from the Wright flyer to the DC-3. In the second third, from 1933 to 1966 or so, we went to color TV, nuclear power, jet fighter aircraft, and Saturn V rockets. If we had continued on that vector, today we would have ocean and Moon colonies, solar-powered cars, and fusion reactors, but we obviously do not. The world today, at least in terms of advanced technology, has not changed that much since the late 1960s, especially compared to how it changed in the previous thirds of the century.

A frontier is a tremendous driver for technological process, because what you typically have at a frontier is a labor shortage. One of the most wonderful things about colonial and nineteenth-century America was the tremendous labor shortage. Despite everything you've heard, which is all true, about the horrendous conditions in the industrial revolution in New England and such places, the fact of the matter is that wages there were vastly higher than they were in similar establishments in Europe, and that's why millions of people voted with their feet to come here. At every level of society, opportunity was better here. Furthermore, because labor was so expensive, there was this tremendous driver for technological progress, for the creation of labor-saving machinery.

On twenty-first-century Mars, no commodity is going to be in shorter supply than human labor. There is going to be a

tremendous drive for advanced technology, some of which might be otherwise blocked on Earth because of popular concerns about the environment or genetically engineered crops.

With human colonization of Mars, I think you will see a higher standard of civilization, just as America set a higher standard of civilization which then promulgated back into Europe. I think that if you want to maximize human potential, you need a higher standard of civilization, and that becomes an example that benefits everyone.

Without an open frontier, closed world ideologies, such as the Malthus Theory, tend to come to the forefront. It is that there are limited resources; therefore, we are all in deadly competition with each other for the limited pot. The result is tyrannical and potentially genocidal regimes, and we've already seen this in the twentieth century. There's no truth in the Malthus Theory, because human beings are the creators of their resources. With every mouth comes a pair of hands and a brain. But if it seems to be true, you have a vector in this direction, and it is extremely unfortunate. It is only in a universe of infinite resources that all humans can be brothers and sisters.

The fundamental question which affects humanity's sense of itself is whether the world is changeable or fixed. Are we the makers of our world or just its inhabitants? Some people have a view that they're living at the end of history within a world that's already defined, and there is no fundamental purpose to human life because there is nothing humans can do that matters. On the other hand, if humans understand their own role as the creators of their world, that's a much more healthy point of view.

It raises the dignity of humans. Indeed, if we do establish a new branch of human civilization on Mars that grows in time and potency to the point where it cannot really settle Mars, but transforms Mars, and brings life to Mars, we will prove to everyone and for all time the precious and positive nature of the human species and every member of it.

