



NEIL DEGRASSE TYSON

HUMAN MOTIVATOR

<https://youtu.be/ivpmUTle6PU>

Thank you for that warm introduction, but it requires a couple of clarifications I'd like to offer. That asteroid with my name on it before I agreed to accept that distinction, I verified it was not headed towards earth. Because that would be rough right there that story Tyson takes out North America. Also, that People Magazine distinction sexiest astrophysicist alive. First you have to consider the category, all right. I don't... not something you get big headed about I don't think. Indeed, my wife is a graduate of Rice University and somehow of all the things that she remembers most, what I seem to hear most about was baker beer bike, right. Is that still happen?

Now back when she was there the official drinking age in Texas was still 14. So, I don't know. Now, why am I asked to deliver this commencement address? I think it's because of my association, my long association as sort of a follower and advisor of NASA. And it was announced that this is the hundredth anniversary the closing of the hundredth year of the founding of the school. It's also the closing of the 50th year of the famous speech given by president Kennedy in Rice Stadium to an audience of 35,000 people. Titled, 'We choose to go to the moon' speech. That very phrase appears in the speech and it is followed by the phrase, 'Not because it's easy, but because it's hard.' That speech was delivered here on the campus of Rice university.

That was delivered a year after president Kennedy announced that maybe the moon is something, we should do some place we should go to. That was first announced in congress, May 25th, 1961. We were spooked into him saying that. Six weeks before that speech the Soviet Union launched Yuri Gagarin into orbit. As I tweeted about a year ago, Yuri again was the fifth mammal to achieve this feat. After a dog, a chimp, a few mice, and a hamster. But the point there is, in that speech that's where he uttered the phrase, 'We will put a man on a moon return him safely to earth before the decade is out.' That's kind of all he said about the moon in that speech. The whole plan got laid out in Rice Stadium a year later.

So, you can say, oh we had charisma and will and political motivation back then, until you look at the beginning of that speech he gave to congress. Three paragraphs, two or three paragraphs before he says we'll go to the moon. He says, 'The events of recent weeks Yuri Gagarin going into orbit'. If those are any indication of the impact of this adventure on the minds of men everywhere, then we need to show the world the path to freedom over the path to tyranny. It was a battle cry against communism. People were spooked.

NASA got founded a year after Sputnik was launched, motivated by a cold war climate. So, what happens president Kennedy gives his let's go to the moon speech in Rice Stadium, a year later Rice donates the land that is Johnson space center. That is the seat of the astronaut program of NASA. Rice university was there at the beginning of this epic adventure to the moon. Now I've studied this, what drives people to do things. I've looked throughout all of time, all of human time and I found only three drivers that get people to do things in a big way. One of them is war, that's obvious to any political analyst.

War makes you spend money like it's a flowing river. Even when you don't have money you spend the money like it's a flowing river. War, one of the great motivators of human conduct. A next motivator is money. So, the first is I don't want to die. The next one is I don't want to die poor, right. Two great motivators in the history of human cultures. There's a third motivator much less revealed in the world today and that's the praise of royalty and deity. That's what gets you the pyramids in Egypt and the Church building and Cathedral building of Europe.

Today you don't find Gods and kings driving major investments. So, we're left with just sort of war and money, that's kind of what's going on here. But we haven't been honest with ourselves about that. If you go to Kennedy space center in Florida, there is that section of his speech. We'll go to the moon before the decade is out and it stands chills up your spine. Because he galvanized an entire nation. But what's missing on the granite wall behind where this is chiseled in, is the other part of the speech. Where he introduces the war driver. No one ever spent big money just to explore. No, no one has ever done that.

I wish they did, but they don't. So, we went to the moon on a war driver. But that's conveniently left out in the granite wall behind Kennedy. They could have put it in, and they could have summarized. Kill the commies go to the moon, right. That's what they could have said but they didn't. That part got cleansed from our memory. So, cleansed from our memory that 20 years after we landed on the moon George Herbert Walker Bush wants to give a similar kind of rabble-rousing speech that Kennedy did.

July 20th, 1989, he goes to the steps of the air and space museum in Washington an auspicious day, commemorating the moon landing. An auspicious moment, and he puts a lot of the same language in his speech. Reflecting on Columbus Voyages and all the, which was driven by money by the way. All the great explorers of the past saying, it's our time it's time to go to Mars, time to go to Mars. It got costed out at \$500 billion, it was DOA in congress at \$500 billion. But, wait a minute. That was going to be spent over about 30 years. You divide 500 billion by 30, that's about \$16 billion a year, that's NASA's annual budget.

You could have just made that the trip to Mars, but people got spooked by the money. Why? You know what else happened in 1989, peace broke out in Europe. That's what happened in 1989 the war driver evaporated. No, we didn't go to Mars, no and people are saying. 'oh, we lost our drive; we lost our will.' No, it's the same will we've ever had we just weren't threatened. That's a sobering thought. But I had there's a solution in there I think, there's a solution. How about the money driver? Do you realize in the 1960s, the GDP per capita of the united states rose 35% across that decade and it hasn't risen that high since?

In fact, in the decade of this century it rose 0% between 2000 and 2010. It been dropping ever since. Of course, there's a lot of complex analysis related to that but all I'm saying is one could say that going into space inspires people. You can remove the war driver and say it'll boost our economy, not just spin-offs. You always have spin off who doesn't love a good spin-off. But it inspires people to innovate. Headlines: We're going to the moon. We're going to Mars. We're looking for water. We're looking for fuel. We want

to deflect an asteroid. These headlines hit the press and you convert; you shape a nation into one that becomes an innovation nation. That's what was going on in the 60s.

Everybody was thinking about the future. That was the bloodiest decade on American soil since the civil war a hundred years earlier. Civil rights movement, campus unrest, 100 servicemen dying a week in a hot war in Southeast Asia. We were in the middle of the cold war. 1968, the bloodiest year in that decade, two assassinations. Apollo 8, an unheralded mission hardly ever hears of Apollo 8. The first mission to leave earth and go someplace other than orbit. It went to the moon, didn't land but it went to the moon, December, 1968. It orbited the moon, came around the back side. They held up a camera and there was earth rising over the lunar surface.

That to this day is the most recognized photograph of anything at any time of any object earthrise. And there was earth, not as we had ever seen it. It was in display as nature would have you absorb what it is. There was earth, not with color-coded countries. There was earth with oceans, land, clouds. Do you realize no representation of earth before that included clouds? No one thought to think that maybe the atmosphere is part of earth. No one drew that before. So, what happens? Here's something interesting. Over the next four years 1969, 70, 71, 72, 73, 5 years the following happens on earth.

The environmental protection agency is founded. A comprehensive clean air act, a comprehensive clean water act is passed. Earth day is founded. The organization doctors without borders is founded. Where do they get that phrase without borders? Where did that come from? Did anyone before that photo think of earth as a place without borders? No. What else happened? DDT was banned, the catalytic converter was introduced, leaded gas was removed from the environment. All of this happened in those five years, while we were still at war. Something changed about us, after the publication of that photo.

It was a cultural response to our presence in space. It affected commerce, it affected how we treated earth. It affected our outlook, it had us thinking about a future as never before. The world's fair in New York city was all about the future. The world's fair didn't create that decade the decade created that world's fair. So, you know what happens? You go to the moon; you look back and it's a whole new perspective a cosmic perspective. We went to the moon to explore it, but in fact we discovered earth for the first time. That takes vision. By the way, the first president of Rice University was an astrophysicist. Look it up.

What a private enterprise they're there, they're going to help out but not going to lead this. You know why they can't lead it? Because space is expensive, it's dangerous and it has unquantified risks. You put all three of those under one umbrella, it cannot establish a capital market valuation of that exercise. Private enterprise comes later governments need to do that first to find out where the trade winds are, map the coastlines of space. Then private enterprise comes in, that's how it's always happened. That's how it happened with Columbus. The first Europeans to the new world were not the Dutch East India trading company ships. It was Columbus funded by Spain in a vision that the nation had of exploration.

All of you will graduate in some kind of major today, a major. But you know what your major is? You can boast what you know in your major but at the end of the day it's actually a stovepipe. You know a lot about this thing that sits in a stovepipe. But I just described to you the Apollo program that involved mathematicians, scientists, engineers, artists. Artists captured what this voyage was on the pages of life magazine and collier's magazine. Artists, engineers, lawyers, yes. There are lawyers in there too. It was an

entire participation of a culture. An interplay of politics, science, technology and who and what we were as a nation.

So, your diploma is really not a ticket to show off what you know. You know what it really is? It's permission to admit to yourself how much you still have yet to learn. And you know it's still left to learn, all the things that come together when great things happen in a nation, when great things happen in a world. As I said the science, the art, the geopolitics all of that matters. Nothing happens without some touching of all those branches of culture. There is no solution to a problem that does not embrace all that we have created as a species.

So, I can tell you the original seeds the space programs were planted right here on this campus. And I can tell you that in the years since we landed on the moon America has lost its exploratory compass. But I know the talent that is seated here, because I have conversations with my wife. I know who's in front of me right now. I know what legacy means. I know what happened here 50 years ago. I know all of this. I can tell you that, now is the time for you the class of 2013 to lead the nation as Rice graduates once again. Thank you all for your time.

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