

## **Earth Alienation from Galileo to Google.**

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In 2010 we celebrate the 400<sup>th</sup> anniversary of Galileo's discovery, by means of a telescope, that the moon is mountainous and that Jupiter is orbited by four moons.

The world has changed greatly in the past four centuries, and many of those changes are attributed to Galileo. For one, by showing that the moon was not a perfectly smooth celestial orb and by demonstrating that the universe had at least one other center besides the earth around which heavenly bodies revolved, Galileo contributed to the downfall of the Aristotelian, Ptolemaic, and Christian cosmologies; he thus played no small role in the secularization of the Christian world.

In addition, Galileo's scientific discoveries helped to launch the scientific revolution, a movement that has brought untold advances in knowledge and technology to the human race.

While Galileo's contributions to religion and science are widely recognized, his most important, fundamental, and far-reaching impact on our world is barely acknowledged.

What I want to talk to you about today is **Galileo, the philosopher**.

As one of first scientific thinkers, Galileo paved the way for the victory of scientific thinking that stamps our world today. And it is the dangers of this scientific thinking for humanity that is the topic of my talk.

My Thesis today is: The scientific way of thinking inaugurated by Galileo in the 17<sup>th</sup> century is, in the first decades of the 21<sup>st</sup> century, forcing us to ask the question that the scientific approach to the world has harbored all along: Is humanity important?

How we humans answer this question will have a greater impact on our world than any scientific, technological, economic or artistic innovation that we may witness. For one thing, in an age of nuclear and biological weapons, we—or some few of us—may well choose to extinguish humanity. Or, in an age of automation where robots and machines are able to perform most economically necessary tasks, those in power may decide that it is better to euthanize the masses of superfluous persons for either economic or environmental reasons, or both.

Although nuclear Armageddon is one button away and Sun Microsystems Chairman Bill Joy has publicly raised the possibility of culling the superfluous, it is far more likely that we as a species will ignore the question.

I fear, however, that the refusal to confront the question of humanity's worth will lead to very nearly the same effect as an affirmative decision of humanicide: In other words, we are now threatened with the possibility that the kindling of the human spark will dampen

so that the darkness of the world will be interrupted only with the most fleeting fires of the human spirit.

### **I. Galileo's Telescope**

Let's begin at the beginning of the scientific revolution, with Galileo's telescope. The technology behind telescopes had been around actually for quite some time, at least since the 15<sup>th</sup> century, and early telescopes were made by craftsmen in England and Holland in the late 16<sup>th</sup> century. When in 1609 two separate Dutchmen independently applied for patents for a device that allowed one to see far away objects as though they were nearby, their patent applications were turned down because it was thought to be too simple a device and too easy to copy. It is not the telescope itself that ushered in the scientific era, but what Galileo did with it.

Galileo constructed an instrument that allowed him, in his own words, to "deliver the secrets of the universe" to the human mind "with the certainty of sense-perception." The point Galileo emphasizes is that whatever the church or the Aristotelians or any other speculators might say about the universe, the telescope permits us to see the truth with the certainty of our senses.

In the ancient philosophical battle between the idealists and the empiricists, Galileo is thought to have given the victory to the empiricists. Against those who might argue for the truth of an idea over reality, Galileo claimed to show that empirical study aided by technological innovation could establish a real truth.

The truth about truth, however, is rarely so simple. In the very same event through which Galileo brought the universe to our senses, he simultaneously revealed the inadequacy of our senses to reveal reality. What the telescope showed is not just that the moon had light and dark spots indicative of mountains and shadows, but also that the world as it is revealed to human beings through their five senses was a world of deception. The lesson of Galileo's telescope is thus twofold:

- 1) we can extend our sensory knowledge to objects that previously were dark and subject to the most baseless of speculations, and,

- 2) our senses are not to be believed.

It is this second lesson, so basic to the scientific way of thinking, which is often ignored by scientists and laypersons as well. What science teaches us is that our senses lie and that the truth, wherever it lies, is not sensible!

Recall that what Galileo saw through his telescope was not the mountains on the moon (his telescope was not powerful enough). He saw dark and light patches that bled into each other on the margins. From this he hypothesized that the border between light and dark was formed by shadows cast by mountains blocking the sun's illumination. Seeing light and dark areas and tracing their movement over the time, he calculated, using the relative distances measured in his telescope, that the moon boasted mountains nearly four

miles high, four times higher than any mountains on earth. He did so without ever seeing the mountains.

Around the planet Jupiter, Galileo never saw moons orbiting (he could not observe for long enough or carefully enough to see such a thing). He saw various different formations of what he first took to be stars that surprisingly moved with Jupiter through the sky over the course of 2 weeks and just as surprisingly changed their location. Again, assuming the validity of certain mathematical constants applied, Galileo was able to calculate elliptical orbits that explained the behavior of Jupiter's stars.

The truth of Galileo's determinations about mountains on the moon and the stars of Jupiter did not proceed from simple sense perception, but from calculation.

The point I am trying to remind you of is that scientific truth is not grounded upon the truth of sense-perception. You and I look at the wood on the floor here and say it is solid. The scientist knows it is filled with molecules and atoms and empty spaces. Does the scientist know that because she sees it? Certainly not. Even if a scientist puts the wood under an electron microscope, she knows full well that her senses may deceive her. While observations can help to confirm scientific hypotheses, sense-perception is neither necessary nor determinative as a proof for scientific truths. What characterizes scientific truths is not that they are visible, palpable, or audible, but that they conform to hypothetical, predictable, and calculable models that we have about the way the world works.

For Hannah Arendt, what is decisive about modern science is the fact that mathematical symbols surpass sense data as the arbiter of truth. The impact of Galileo's telescope was to confirm our worst fear that our senses might betray us. While the senses had long been known to be unreliable, Galileo demonstrated that fact and also offered a solution: from henceforth our human senses were to be subject to the truth of our cognitions, that is to a non-sensible, mathematical, universal, and thus un-earthly standard.

To understand the importance of the change the science brings to our being in the world, consider your experience of the Hudson River.

[I hope you've had the opportunity to walk over and think alongside the river as it flows through Bard's campus, to contemplate its course, and to read on its banks.]

What is the Hudson River? Well, Google tells me it is a 315-mile (507 km) river that flows from north to south through eastern New York. But what is it as a river? Can we even experience the Hudson as a river, a powerful, living, natural body of water?

No. The Hudson has long since ceased to be a river. It is today, a waterway of commerce. Or it is a garbage dump for PCB's or an environmental disaster. We can make it safe for fish and swimming or we can choose to leave it polluted. We can, if we want divert its course, dam it, turn it into a lake, or, even, get rid of it entirely. Even to the extent we were to restore it to its pristine nature, we are the one's who do so.

And that is the point: The Hudson is today a human creation, even to the extent we decide to let it be. To look at the river today is to look at something that we create.

And the Hudson is here a stand-in for every single being in a scientific world. Whether it is a river, a house, an island, the earth, or a human being, all beings today are potentially human creations. Man, as the being capable of calculating in accord with a mathematical and universal calculus is the one being who can manipulate, master, destroy and create all beings, even himself.

As Arendt writes, the scientist places “nature under the conditions of his own mind, that is, under conditions won from a universal, astrophysical viewpoint, a cosmic standpoint outside of nature itself.” This cosmic standpoint outside of nature is that of pure mathematics, which is why Arendt can conclude that arithmetic and calculus “became the leading science[s] of the modern age.”

## **II. Despair**

One paradox of this scientific approach to the world is that it simultaneously elevates man to the status of a mini-God who can remake the world and diminishes man. From the perspective of science, the earth and the humans who live upon it have no special place in the universe. By transforming the very idea of truth from a human-centered idea (the sun moves across the sky) to a cosmic standpoint outside of space and time, Galileo and the

modern scientists contributed both to mankind's prideful faith in its ability to unlock the secrets of the universe and also to our most profound despair.

The despair that inheres in the scientific way of thinking diminishes mankind.

For the biologist who understands man as simply one particular kind of organism, ...

for the Darwinist who denies that man is either the highest or the final stage of biological evolution, ...

for the chemist who understands human free will to be simply a series of electro-chemically determined reactions, ...

for the physicist who understands the entirety of the universe as the lawful unfolding of physical properties, ...

for the political scientist who imagines that politics follows the rational choices of interested actors, ...

for the economist who imagines that the inexorable laws of supply and demand trump human needs, ...

...in all of these sciences we are confronted by the meaninglessness and unimportance of human life within the grand scheme of the physical and moral universe.

The despair of scientific humanity is also present in the physics of Werner Heisenberg and Niels Bohr in which causality--and even the lawful appearance of the physical universe--are simply categories of our necessarily prejudiced conceptual frame. The

entirety of the world as we know it, in other words, is simply a prejudice of our human perception.

And the despair of scientific humanity is most recently showing itself in the idea of the Singularity. As Ray Kurzweil has been arguing, it may be that human beings exist simply to invent computation that will allow us, in the very near future, to overcome our human and limited brains and merge with machine intelligences in ways that will lead to the determination of a singular cosmic intelligence that will govern the universe in harmony and peace?

That Kurzweil, along with Sergey Brin and Larry Page, welcome the Singularity with optimism, should not change the fact that they are indeed talking about the technological extinction of the human race.

Or does it: Kurzweil argues that humanity will continue to exist in the hybrid man-machine-cosmos beings of the singularity because the essential character of humanity is that humans inherently “seek to extend their physical and mental reach beyond current limitations.” As we merge with machines and with the cosmos, he argues, our civilization will “be more exemplary of what we regard as human than it is today, although our understanding of the term will move beyond its biological origins.” It is difficult for us mere humans to know what we will be in the coming decades, but Kurzweil is hopeful that we will continue to expand our intelligence, our dreams, and our desire to improve the world.

Is such a world, as Kurzweil and other scientists imagine it today, still human? That depends on what we mean by human. And the inquiry into what humanity is cannot be a scientific question.

To ask this question, I want to look at one of the greatest attempts to answer this question of humanity, Hannah Arendt's book, *The Human Condition*.

### **III. The Earth in the Prologue to the Human Condition**

Arendt writes in her prologue:

**“The Earth is the very quintessence of the human condition...”**

What does this mean? I hope you were struck by this when you read it and stopped to ask yourselves: what is the earth as the quintessence of the human condition?

Her sentence continues:

**“The Earth is the very quintessence of the human condition, and *earthly nature*, for all we know, may be unique in the universe in providing human beings with a habitat in which they can move and breathe without effort and without artifice.”**

We learn, therefore, that the earth and its natural environment—its oxygen rich atmosphere, its abundance of water, its temperate climate—allow humans to live without

artifice. That is naturally. Is this evidence of a kind of romanticism? Is Arendt possessed of a strange nostalgia for nature?

That nostalgia for a natural existence is not Arendt's interest is made clear by the next sentence:

“The human artifice of the **world separates human existence from all mere animal environment...**”

Her point is that simply to live, as do plants or animals, does not constitute a human life. Not only by building houses and erecting dams, but also by telling stories and building political communities that give to man a humanly created world in which he lives.

We need, however, to finish reading this sentence in order to glimpse the problem Arendt is confronting. She writes:

“The human artifice of the world separates human existence from all mere animal environment, but **life itself is outside this artificial world**, and through life man remains related to all other living organisms.”

We are now faced with a paradox. On the one hand,

- a. Humans are artificers and only live in artificial world.

On the other hand,

- b. Life is not artificial.

Arendt seems to leave us a riddle: If she so values human creative power, why does she celebrate the brute simplicity of the earth as a natural and non-artificial habitat as the quintessence of the human condition?

The answer is that Arendt embraces an ancient understanding of man as the one unique being in the world that is both created and creating, both unfree and free. Over two millennia ago, Sophocles, in his “Ode to Man,” named man *Deinon*, a Greek word that connotes both greatness and horror, that which is so extraordinary as to be at once terrifying and beautiful. As an inventor and maker of his world, this wonder that is man terrifyingly carries the seeds of his destruction. As he invents and comes to control his world, he threatens to extinguish the mystery of his existence, that part of man that man himself does not control. As the chorus sings: “Always overcoming all ways, man loses his way and comes to nothing.” If man so tames the earth as to free himself from uncertainty, what then is left of human being?

Sophocles could ask that question in the confidence that it would always remain a question. Similarly, Immanuel Kant knows that man is a rational being, one who is both, as a being, determined by natural laws, and, as free, one who can make his own laws. As autonomous, man is both lawful and also capable of giving the laws to himself. From Sophocles to Kant, as great as our technical powers might be, our power had limits so that our lives remained subject to a fate beyond our control and comprehension. That is what the Greeks meant by mortality and what separated humans from the Gods. Our

human finitude—our mortality and the impenetrable mystery of being—these are the attributes of humanity that Arendt names our earthly nature.

The problem Arendt confronts in *The Human Condition* and indeed throughout her writings is that the scientific age has sprung man from his finitude and his mortal limits. As she writes in the very next sentence:

**“For some time now, a great many scientific endeavors have been directed toward making life also ‘artificial,’ toward cutting the last tie through which even man belongs among the children of nature.”**

With the possibility of making life one of the many artifices that humans create, we humans of the scientific age are breaching the last barricade that characterized a distinctively human way of life. Even man, as with all of nature, will be a product of human hands. We will, as Arendt writes, soon “produce superior human beings.” We will be able “to alter [their] size, shape and function.”

The desire and the imminent possibility of making life itself artificial is indicative of a profound “wish to escape the human condition” that is expressed in the “hope to extend man’s life-span far beyond the hundred-year limit.” What Mankind wants, Arendt sees, is to free himself from nature and biology. This is what she means with her citation of the Russian Cosmonaut that “mankind will not remain bound to the earth forever”

In pointing to the launch of Sputnik and the possibility to “produce superior human beings,” and to extend human “life-span far beyond the hundred-year limit,” Arendt shows us what the loss of our earthly nature is. It is, she argues, the loss of our humanity insofar as we humans are, as humans, subject to chance, fate, and fortune. She writes:

**“This Future man, whom the scientists tell us they will produce in no more than a hundred years, seems to be possessed by a rebellion against human existence as it has been given, a free gift from nowhere (secularly speaking), which he wishes to exchange, as it were, for something he has made himself.”**

This is the key sentence of the Arendt’s prologue, so note it well. Her point is that human existence is not something humans make or control. Unlike the artificial world we create, we ourselves are a free gift. In a religious register, that gift can come from God. In a secular world, the free gift of human existence is a matter of fate, chance or fortuna. In religious or secular terms, however, the human condition is one of finitude and mortality. It is this aspect of our humanity that science threatens, insofar as science internalizes a way of thinking that yearns to fully master all elements of the earth, including humans themselves.

The earth, then, is Arendt’s name for that one aspect of man’s world—his finitude—that must remain natural if man is to remain human. While humans may cultivate crops and domesticate animals, while we may build dams and form polities, we cannot, as humans, shed our mortal coil. To be alive, man just as animals and plants, must be born and he

must die and this life process is an organic and natural event that must remain free from the artifice and fabrication that humans bring to all other aspects of earthly existence. The mortal course of human life, Arendt writes, **“is outside this artificial world.”**

Arendt ends these pregnant two paragraphs of her prologue with a question:

**“The question is only whether we wish to use our new scientific and technical knowledge in this direction, and this question cannot be decided by scientific means; it is a political question of the first order and therefore can hardly be left to the decision of professional scientists or professional politicians.”**

Before we address this question of how to respond to the inhumanity of science, need to better understand precisely what the threat to our inhumanity means.

#### **IV. Google**

If I suggest that Google may pose a threat to humanity, I do not mean it in the sense that it is a big corporation that is taking over the world. Nor do I mean that Google is invading our privacy and controlling our behavior. There may be some truth to these claims, but I have something else in mind.

What, we may ask, does Google want? The answer is clear. It wants information, lots of it, to offer better results to the queries we pose it. We might go further and say: Google wants all the information in the world. Derived from the word ‘googol’ meaning a One

with 100 zeroes after it, the ambitions underlying Google are to bring the entire knowledge base and intelligence of the universe into a single cloud-based realm that, as the map of the Empire in Borges' story "Exactitude in Science," spreads over the entirety of the world, with the great difference that Google is useable whereas Borges' map is not. So how does Google threaten to alter humanity? Consider a few examples:

**\*One book.** Kevin Kelly argues that Google means that books disappear, replaced by the "one book" in which the entirety of written content subsists in cloud "accessed via user interfaces that encourage mashups of fragments that obscure the context and authorship of each fragment." The same, by the way, is true for movies. Forget nostalgia for the book and the feature. The bigger question is how we will encounter contrary ideas. In order to be persuaded, in order to think something through, requires time. An argument must be developed, laid out, and carried through. When all media is mashed up content, we do not encounter other viewpoints and other persons in the complexity and power of their individual thinking. In a world of fragments, the activity of thinking is reduced to the practice of marshalling data.

**\*The Google App (of the future)** Gary Kasparov, the world's greatest chess champion, has written about the impact of computers has been on Chess and his insights are, I think, helpful in thinking about how computers may at some point impact life. According to Kasparov, machines have changed the ways Chess is played and redefined what a good chess move and a well-played chess game

looks like. The machine doesn't care about style or patterns or hundreds of years of established theory. It is entirely free of prejudice and doctrine and this has contributed to the development of players who are almost as free of dogma as the machines with which they train. In Computer chess, a move isn't good or bad because it looks that way or because it hasn't been done that way before. It's simply good if it works and bad if it doesn't. It is likely, I suggest, that as more and more of our daily tasks are performed with the assistance of and in interaction with computers, we too will become more rationalized and robotic in our thinking. Will this challenge our humanity?

Kasparov's most interesting speculations regard the effects of chess matches with humans playing in tandem with computers. In such matches, age and experience are neutralized. Youth is advantaged. While human intuition matters, the skill and experience differentials between players is diminished and the playing field is leveled. Also surprising and unexpected moves are less successful, as the opponent, aided by a computer, can usually neutralize the element of the unexpected. Outside of chess, as we go through the world with Google in our computers, our phones, and soon, on our contact lenses, we will rarely, if ever, encounter something is strange, new, and surprising. We will lose the experience of the Earth in the sense Arendt uses it, as that which is spontaneous, a free gift, wondrous, and mysterious. Cheap and easy access to unlimited computer power will largely neutralize the genetic or social advantages of extraordinary memory

or excellent schooling. All of this will happen, to some degree. Does this challenge our humanity?

The questions these examples raise is: Is such a world less human? And, Does it matter that our lives will, to an extent unimaginable for most of us today, increasingly be lived in ever-more-intimate collaboration with computers and computer intelligence. Like an astronaut living in a spaceship, we will spend out entire lives in artificially created environments where everything we experience and know is or might be a creation of human artifice.

I am sure some of you are familiar with the transhumanism movement whose motto is: “People of the world, Unite! You have nothing to lose but your biological chains.” For transhumanists, we humans have a right to change and upgrade our bodies in any ways we want and to upgrade the brains and appearances of their children. Speaking of neural implants and prosthetic limbs, these transhumanists imagine a world of infinite possibility for human development.

One frequent and I think mistaken critique of this view is that it means all humans will be the same and diversity will end. There is no reason to believe, however, that everyone will want to be a blonde Einstein or a Rhodes Scholar soccer star. Differences will emerge: for good and bad. Elites will continue to exist, as will outcasts. And discrimination will persist. I don’t worry about the homogenization of the world. Nor did Arendt.

Arendt's worry about the new freedom that transhumanists claim is different. What she finds is that the scientific freedom that inheres in our alienation from the earth is the same freedom that leads seamlessly to Ray Kurzweil's dream of the Singularity, the complete subordination of humanity to a cosmic truth and thus the extinction of mankind.

Again, we need to ask: Is such a world human? And since we cannot stop the coming to be of such a world, we also need to ask: What does it mean to be human in such a world?

As I said earlier, science cannot answer the question of how we are to be human in an Inhuman Age. That is a question that can only be asked and only be answered by humans.

I have no answer for you today, but this one. Asking the question itself—to quote Arendt's teacher, Martin Heidegger, is the fitness of thinking.