



## Science and Progress\*

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### Abstract

*Science has become a part of almost every aspect of our life and takes justified credit for our progress. However, the fundamental myth of progress—that it produces a steady betterment of life—is crumbling before our eyes. The experience of the twentieth century, with its civil and world wars, Gulags and Holocaust, was too tragic to support a continued belief in a kind of granted optimism of world history. Unfortunately, science development is distorted by our modern social organisation and economic system. In this model science becomes an obedient servant of the system. Science allows us to do more, but it doesn't tell us whether doing more is right or wrong. Therefore, with scientific advance, we need greater ethical vision; better judgment; and stronger analysis of how to use knowledge for good, not evil. Science should not be accused for misuses of its advances. It is not science, but ignorance, that is to be blamed. Therefore education—new universal education—is critical, and not just for those who expect to practice science but for everyone who lives in the modern world and especially, political leaders. This will require a rapid transition to a different model of development, which not only takes into account the interests of short-term growth, but provides the opportunity for sustainable and inclusive development. Change may be frightening, but it is inevitable. And, in fact, it provides an opportunity to improve our instruments, our strategies, and... possibly ourselves. The wave of technological change is far from its peak. We should be excited and filled with hope—by where it could take us, of course, only if we chart the course properly.*

*Is it progress if a cannibal uses a fork?*

**– Stanislaw J. Lec**

We live in a golden age of technological, medical, scientific and social progress. Just look at our gadgets! Twenty years ago, the internet was a geek thing. Now we can't imagine life without it. We are on the verge of medical breakthroughs that would have seemed like magic only half a century ago: cloned organs, stem-cell therapies to repair our very DNA. Even now, life expectancy in some rich countries is growing by five hours a day. A day! Surely if not immortality, then something very close to it, is just around the corner...

Science has become a part of almost every aspect of our lives and takes justified credit for the great strides of His Majesty the Progress. And yet somehow, this does not feed our enthusiasm.

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The fundamental myth of progress—that it produces a steady betterment of life—is crumbling before our eyes. The experience of the twentieth century, with its civil and world wars, Gulags and Holocaust, was too tragic to support a continued belief in a kind of granted optimism of world history. Today, Islamic State and the refugee drama, to say nothing about the growing list of existential threats from climate change to hybrid/proxy wars erupting in many parts of the world, do not add up to an optimistic picture.

As Stephen Hawking rightly argues, the human race faces one of its most dangerous centuries yet as progress in science and technology becomes an ever-greater threat to our existence. “We are not going to stop making progress, or reverse it, so we must recognize the dangers and control them,” he warns.

Here, it seems pertinent to ask the paradoxical and provocative question: why during the last hundred years, has the idea of progress transmuted from the idea of almost a “salvation” into a dangerous factor, fraught with wars, almost ceaseless violence and existential threats to humanity?

I am not doubting scientific progress. But I do wonder about how science development has been distorted by our modern social organisation and economic system. I wonder whether real progress could have been much more impressive and tangible. I am thinking of the goals and definitions of progress.

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## 1. What is Progress?

Different dictionaries state that progress is a forward or onward movement towards an objective or a goal. The concept was introduced by Enlightenment as a secularization of the Christian idea of the 8<sup>th</sup> day. Christianity believed that human development (understood as spiritual growth), rooted in human ontological freedom, was the purpose of history. Most clearly this idea was expressed by Hegel: “The introduction and pervasion of the principle of freedom in secular relationships is a time-consuming process, which constitutes history”. The goal of progress was well formulated in the 19<sup>th</sup> century by Russian thinker Chernyshevsky, who said that progress is the desire to “raise a man into human dignity”, and “without freedom a man cannot be a man”. Thus human being was considered not as a perfect and complete entity, but something that always remains in formation. Consequentially progress was understood as an endless human ascension on the road of self improvement.

The twentieth century, driven by neo-liberalism and post-modernist transition, has horrendously distorted the very notion of progress. The idea of freedom as the foundation of progress was replaced by the idea of happiness—a fuzzy concept that could mean many different things to many people. The United Nations even declared the International Day of Happiness (20 March) to recognise “the relevance of happiness and well-being as

universal goals.” Predictably this idea has ultimately evolved into the hedonistic trend of seeking pleasant experiences and avoiding unpleasant experiences—building a sort of heaven on earth based on improvement not of a human being but his living standards. However, since scientific and technological development (which has always been inalienable part of progress) successfully continued, it seemed that progress was underway. It remained largely unnoticed that the idea of freedom, without which the very notion of progress becomes void, had been gradually abandoned.

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*“Science can only tell us what exists and not where we should head.”*

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Recently UNESCO proudly reported: most countries, regardless of their level of income, now see science and innovation as key to fostering sustainable economic growth and furthering their development. But do you notice the double-meaning of that statement? In fact, there is a stark difference between science and innovation. While science implies investing money in research, innovation, though, is often simply the conversion of research into money...

Striving to fulfil the ever-growing appetites for joy and happiness, progress today is reduced largely to consumer-driven, often banal improvements in technology. Sure, our phones are great, but that’s not the same as being able to send a man into the outer space, to fly across the Atlantic in eight hours or eliminating smallpox and other quantum leaps of the post-war Golden Quarter. As the US technologist Peter Thiel once put it, “We wanted flying cars, we got 140 characters” (on Twitter).

If it were not for distorted frameworks, we could be living in a world where cancer and Alzheimer were treatable, where clean power would end the threat of climate change, where the brilliance of genetics would be used to bring the benefits of cheap and healthy food to the bottom billion, and where poverty would have been a thing of the past.

It feels bitter to think in the year of the 55<sup>th</sup> anniversary of Yuri Gagarin’s first space flight, that after a century of fateful scientific breakthroughs the twenty-first century—at least its beginning—turned out to be a tremendous setback when archaism and the darkest superstitions have been reborn into the modern world where 21<sup>st</sup> century technology helps spread images of barbaric decapitations in front of the cameras, and wars have become inalienable elements of “hybrid” peace.

And it is not about making science a scapegoat for misuses of its advances. It is not science, but ignorance, that is to be blamed for both—misusing and hampering it.

However, the XXI century has made one thing clear: the scientific endeavour is as much about us as it is for us.

We have to realize that science allows us to do more, but it doesn’t tell us whether doing more is right or wrong. Science can only tell us what exists and not where we should head.

Goal setting is the function of values acquired in the course of history. This is why values are not a “superfluous resource” but basic intangible assets of civilization. Technically equipped, but morally flawed attempts to shape the future, risk turning into disastrous defeats that go beyond just restitution of the past (we see it already around us—rebirth of nationalism, the barbarisation of populations, demise and flagrant violations of international law, the dehumanising effects of pop culture).

Therefore, along with accelerating scientific advances, we need greater ethical vision; better judgment; and stronger analysis of how to use knowledge for good, not evil.

Of course, all this does not mean that we should reject rationalism. Simply there are other dimensions to humanity that must be respected along with rationalism. Many areas of life are simply too non-physical to be satisfactorily addressed by science. Love, hate, relationships, poetry, art, music, literature, and spirituality are all outside the realm of science. Any problems that arise in these areas cannot be resolved by science.

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*“Has anyone really looked for connections between culture, mathematics, and science? How about intuition and reason?”*

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To suppress and ignore these dimensions prevents even rationality from functioning properly. As Werner Heisenberg explained this in his philosophical work *The part and the whole*, “Science is made by man. This is a natural fact that is easily overlooked; another reminder of it can help reduce the regrettable gap between the two cultures—arts and humanities and science and technology”. Both emotions and morality must work alongside rationalism as parts of the living totality that is human existence.

I am not promoting the merger of science and arts. Good art and good science necessarily require high degrees of specialization. After all, there will always be things that anyone understands, but cannot explain: for example, any idiot sees that the ball is not a bagel, but you have to be Poincaré to see the problem here, and Perelman to solve it.

However, was it a coincidence that Einstein, Heisenberg, Gödel—the three geniuses who have propelled modern science from determinist universality based concept of material world into the age of complexity, relativity and uncertainty—had excellent philosophical and/or musical education? Was it a coincidence that Leibniz was a writer and a philosopher while Gauss and Fermi were renowned philologists? Is it also a coincidence that over 75% of the Nobel laureates in science have had expansive knowledge in humanities and have been proficient in music or literature?

## **2. How many coincidences are needed to recognise the regularity?**

Has anyone really looked for connections between culture, mathematics, and science? How about intuition and reason? It was 300 years before Einstein that Shakespeare intuitively guessed about relativity of time in his sonnet 77. 100 years later Bach’s fugues provided a musical model of the modern concept of Universe. It took centuries until Einstein—who, by the way, used to say “I often think in music”—showed us how it all connects and turned the divine revelation into a scientific discovery.

Einstein directly warned about detrimental effects of science dehumanisation in 1946: “I think the root causes of a frightening world’s ethical degradation are mechanization and dehumanization of our lives. This is a fatal side effect of the development of scientific and technical thinking. It is our fault! I do not see a way out from this plight. A man cools down faster than the planet on which he lives.”

Therefore, the road to real progress, as Freud and Einstein agreed, must begin here with us, in our own attitudes. And a trip to Mars—a dream which, thanks to God, now seems to be reborn—will not make us any smarter or more tolerant and human. We need to do something with ourselves and understand something about ourselves...

I think this was exactly what Nikola Tesla meant when he argued: “The day science begins to study non-physical phenomena, it will make more progress in one decade than in all the previous centuries of its existence.”

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This will require a new type of universal education and not just for those who expect to practice science but for everyone who lives in the modern world. We need it because education is a catalyst for important, sustainable change in our society. We need it to help youth to chart the course. We cannot just train them to “succeed” in the current system—that is not real education. We must inculcate in them a broader world vision and a greater capacity for critical thinking. Political leaders, in particular, badly need to be exposed to scientific vision. The mind, once stretched by a new idea, never reverts to its original dimensions.

It is easy to dismiss the suggestion that science driven technology can save the day. After all, technological advance also requires good governance, market forces, effective universities, and more. Politics will still play its role.

Nevertheless, it’s time to recognize that governments are ill-equipped to understand the scientific determinants, sophisticated technological challenges and opportunities facing the world, and that new instruments are needed to ensure that science and technology are adequately applied to address a wide range of increasingly urgent global problems and not just to make our smartphone batteries last longer (which personally I would not mind at all).

This new universal education should enable us to master the cultural riches accumulated by humanity. And only then high culture multiplied by the achievements of scientific thought, interacting, enriching and feeding one another, will guarantee the real human-centred progress.

Ultimately, we need a rapid transition to a different model of development, which not only takes into account the interests of short-term growth, but provides the opportunity for sustainable and inclusive development and returns meaning to the lives of individuals.

Change may be frightening, but it is inevitable. And, in fact, it provides an opportunity to improve our instruments, our strategies, and... ourselves. The wave of technological change is far from its peak. We should be excited and filled with hope—by where it could take us, of course, only if we chart our maps properly...

On Christmas day in 1989 conducting Beethoven's famous and mysterious Ninth Symphony, known as Ode to Joy to celebrate the fall of the Berlin Wall, Leonard Bernstein replaced "Freude" ("Joy") with "Freiheit" ("Freedom"), allegedly reverting to the original title of Schiller's poem that he had had to change to avoid censor's recriminations. I am still wondering, was it the great Maestro's brilliant situational improvisation to symbolize the Germans' jubilation of the retrieval of the divine gift of freedom? Or was it the prophetic Omen—"the writing on the wall"—reminding us that freedom is humanity's historic invariant, abandoning which will not be without consequences.

In any case I hope that the last century of great scientific discoveries will be followed again by the Age of Enlightenment—one that will illuminate the progress of Humanity.

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