



**Prof. Jerzy
Kołodziejczak**

was a physicist who served in 1999–2003 as Vice-President and President of the Polish Academy of Sciences.

It is with great sadness that we note that Prof. Jerzy Kołodziejczak passed away on 1 August 2022.

He had served as the Director of the PAS Institute of Physics, the Chairman of the Scientific Council of the PAS Institute of Physics, and the Chairman of the Scientific Council of the PAS Institute of High-Pressure Physics. He was an Ordinary Member of the PAS and also a member of the Warsaw Scientific Society.

ARE WE ON THE VERGE OF AN ERA OF NEOIGNORANCE?

Why do some people call into question the methodology of science and its achievements? Why are such opinions garnering public interest and even support, even though their arguments are primitive and disconnected from the facts?



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Jerzy Kołodziejczak

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Many manifestations of public life point to the twilight of the contemporary stage of civilization, which was a natural consequence of the Age of Enlightenment, born out of the intellectual freedom of the most prominent representatives of humanity who lived in the period from the late seventeenth century to the nineteenth century. In that epoch, human reason, freed from all shackles, was seen as the light illuminating the path to knowledge of the truth about the world and man. It was human reason that led to the scientific revolution in the late nineteenth and early twentieth centuries, and then – as a result of the practical application of the new knowledge about the world and its phenomena – to the acceleration of the industrial revolution and the technological revolution, with the latter continuing until now. Certain cyclical macroeconomic phenomena are closely linked to groundbreaking scientific discoveries, which are pushing the boundaries of industrial

activity and therefore defining the ways in which societies are organized. The nineteenth century saw the development of industry using thermodynamics and the study of electricity. The twentieth century started with fundamental discoveries and understanding of the nature of the microworld. It was a period of the atom and electronics. In turn, the early twenty-first century was defined by computer science, biotechnology, nanotechnology, and genetic engineering.

How far forward has mankind managed to leap since the times of cave dwellers? The answer would seem to be clear and obvious to everyone.

And yet...

Theories questioning the achievements of modern science continue to emerge. Let us cite here a few examples: *there is no coronavirus, and the pandemic was caused by the development of the 5G mobile network. Vaccines are harmful to humans and have numerous negative effects, which include altering human DNA. The Earth is flat, not spherical. There is no global climate change, and if there is, it has not been caused by not human activity, but by the shifting of the North Pole towards Siberia. The Earth's climate has changed many times throughout history, even before the advent*

Speakers' Corner in London's Hyde Park is a place where everyone is permitted to freely express their views on any topic, in the name of the freedom of speech



ACADEMIA PART III The Current Threats

Theories that run counter to today's scientific knowledge include the one promoted by flat-earthers



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of man, and such changes have always been induced by various natural processes. The moon landing was a hoax, and the films were fakes made in Hollywood.

Such disinformation and fake news stories are often spread with the help of media outlets focused on sensationalist coverage. A special role is played here by the Internet, where anyone can write anything and trumpet all sorts of nonsense as the alleged scientific truth. This bears a resemblance to London's famous Hyde Park, a forum allowing for the free expression of all views for the sake of the freedom of speech (provided that the speech does not offend the Queen). The Internet, online platforms, and instant messengers are not only carriers of true scientific values, seedbeds for rationalism, and sources of knowledge. Unfortunately, they have also become a very serious source of tacky content, stupidity, and pseudo-knowledge. The goal is, obviously, commercial. But for reasons related to how this mechanism functions, people's imagination has been captured by mass and primitive pop culture and individuals who are famous for being famous. It is them who are pushing through this irrational message, supported by politicians who dream of ruling an uneducated yet obedient nation without any problems. In this way, the marvels of communication tools, which are products of great minds, are turning against the idea behind their development to serve an evil cause. For these reasons, Internet users should be advised to be very careful and to learn to distinguish truth from falsehoods.

I will not comment here on information that obviously contradicts the facts and is published by various media outlets, on the Internet, and sent via various messengers. Examples are numerous, e.g., the flat Earth model and the shift of the North Pole towards Siberia as the cause of climate change. Likewise, there

is no point arguing with pseudo-theories about the alleged moon landing hoax or with those who promote the view that the recent pandemic has been caused by the 5G technology used in the mobile networks. Proponents of such views cannot point to any physical or medical mechanism that could have caused the pandemic. Such false statements are formulated intentionally and are contradicted by what we know about the effects of microwave electromagnetic radiation on the human body. Their authors ignore the existence of the coronavirus as an empirical fact confirmed by numerous observations. They probably do not know that scientists have accurately pinned down not only the morphological form of the coronavirus, but also the way in which it affects the human body.

A special case

In turn, the issue of climate change must be taken more seriously. It is undoubtedly true that throughout history the Earth's climate has changed many times due to natural causes. Billions of years ago, the species of microbes known as cyanobacteria evolved in the primordial sea and changed the composition of the Earth's atmosphere, saturating it with oxygen, a gas that was poisonous to life at that time. This led to the emergence of new, more energy-efficient life forms based on the oxidation processes. The absence of greenhouse gases in the atmosphere caused a global ice age, and the surface of the entire planet became covered with glacial ice (the Snowball Earth). After that, natural volcanic processes triggered the emissions of greenhouse gases, temperatures rose, and the glaciers began to retreat. Yes, throughout the Earth's history, natural processes have resulted in global climate change many times. But this does not mean that

humans cannot be the cause of the changes underway right now. We know the exact amount of greenhouse gases emitted into the atmosphere as a result of human economic activity. Science allows us to predict what changes in the Earth's temperature may be caused by this amount of greenhouse gases. The scientific conclusions are unambiguous and consistent with what anyone can observe in winters without snow and heavy frost. The accelerated retreat of glaciers in Greenland, in the Himalayas, and in Antarctica is a serious warning to humanity. Humans did not appear from nowhere – together with all of their activities, they are a natural part of nature at a certain stage of life of our planet. In this sense, the ongoing climate change has been caused also by natural processes. The Earth will survive this change, but this may not be true for the species that now inhabit it, including humans. They will be replaced by other species, just as cyanobacteria once were.

Spreading fake, pseudo-scientific news leads to the emergence of various conspiracy theories holding that some dark forces want to take over the world and enslave people's minds through special microchips allegedly planted in humans with COVID-19 shots. Anti-vaccination movements claim that this is the purpose of aggressive pro-vaccination propaganda, and there is no pandemic. Such propaganda is intended to scare people enough to take vaccines, and if they do not agree, vaccinations will become mandatory.

Neignorance

Why do some people call into question the methodology of science and its achievements? Why has their number grown so dramatically in recent decades that we can say we are about to enter an “era of neignorance”?

It appears that the reason lies in great and rapid advances in science and human development. The vast

accumulations of knowledge and the complex nature of science and technology render these advances extremely difficult to absorb and understand, even for well-educated people.

In the late eighteenth and early nineteenth centuries, when the English physicist and chemist Michael Faraday was presenting the results of his cutting-edge research to the British Royal Society, all of its members, regardless of their specialization, understood those findings. With today's knowledge and very narrow specializations, something of this sort would be impossible. What, then, should poorly educated or uneducated people do, frightened by what they can observe yet not understand? How are they supposed to absorb and understand this huge amount of knowledge that is so hard to grasp?

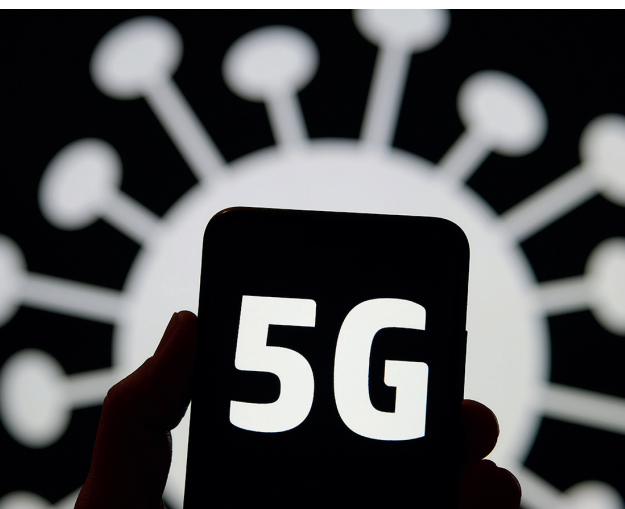
This is impossible, so they restrict themselves to newspaper headlines, and believe that once they read them, they will know everything. They rely on general slogans, but they do not in fact understand

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their meaning. By its very nature, fake news offers simple explanations of very complicated processes and phenomena taking place in the world. By uncritically absorbing pseudo-scientific reports from various outlets, the Internet, and social media, such people create their own interpretation of the problems and phenomena that interest them, which gives them a false sense of their comprehension. Unlike others, they know the truth. It does not matter that such pseudo-knowledge is not supported by facts. If it contradicts the facts, then so much the worse for the facts. Such people, being ignorant of science, are also arrogant. I do not know how many times I have heard such “intellectuals” mocking science as useless: “People had runny noses back in ancient China, and they have runny noses now, so what has medicine given us?”. In this type of people, we can observe a certain pattern of behavior: the degree of their arrogance and self-confidence is inversely proportional to the level of their knowledge.

Fortunately, there are also people who not only read newspaper headlines but also reach for professional literature on specific subjects to learn more about the world. But even this does not make them

According to one conspiracy theory, the coronavirus pandemic is caused by 5G technology



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Reliable knowledge lies not in conspiracy theories, but in scientific research and statements by experts

experts in comparison with people who have spent years or sometimes their whole lives conducting scientific research to uncover the truth about the world and its phenomena.

If neignorant individuals take up important positions in decision-making and political spheres, this may have especially dangerous consequences. When combined with various ideologies and the replacement of science with pseudo-science for the purpose of political needs, ignorance has often triggered dramatic events, bringing nations and the world to the brink of ultimate catastrophe. Consequences of ignorance on the part of those in power and state support for pseudo-science deliberately created to meet the political needs of Nazism and communism should serve as a warning. The effects included millions of deaths in two world wars and the planned, industrial-scale extermination of entire nations.

Fortunately, most people have open minds and are aware of the vastness of today's knowledge. They realize that they will never know everything, especially not in a way that will allow them to understand everything. Such people understand what the scientific truth is, how it is reached, and how it must be verified. If they want to learn something, they will go to true experts. On matters related to the pandemics and COVID-19, they will go to virologists, vaccinologists, and epidemiologists, and they will consult with climate scientists to find out more about climate change. Such people can verify sources of information, so they will reject the theories of self-proclaimed pseudo-intellectuals on the Internet, and trust the research findings of reliable professors from Oxford.

Unfortunately, we can see an alarming trend of such attitudes becoming increasingly rare, just as increasingly loud-mouthed and aggressive ignoramuses are growing in numbers. This must raise justified con-

cerns about the world entering an era of neoignorance. Members of the scientific community are increasingly remaining passive in the face of these dangerous phenomena. This probably results from the conviction that they have no influence whatsoever on the course of the events or their scale, as well as from their powerlessness and the lack of tactics in the "battle for the truth." So we shut ourselves up in our ivory towers and devote ourselves to our mission, which is digging at and uncovering the scientific truth. While doing so, we forget that the mission of scientists also involves disseminating this truth and actively fighting against falsehoods. Since we are not doing enough to popularize scientific knowledge, the public is defenseless and vulnerable to falsehoods. This fact is used, consciously and with premeditation, by dangerous falsifiers of truth. In the mission of a scholar, the promotion of scientific knowledge – not only through professional, specialized, and often hard-to-understand publications, but also through various forms of science popularization – is no less important than scientific inquiry itself. Voltaire corresponded with emperors and kings not for the sake of a hollow fame, but in order to enlighten them.

Media outlets, including social media platforms, are full of categorical and arbitrary statements that promote some alleged "truths" and conspiracy theories. In addition to actively fighting against falsehoods, we should put the issue succinctly and tell the authors of such pseudo-truths: go learn, educate yourself. The level of self-confidence and arrogance is always inversely proportional to the level of knowledge. Socrates discovered this truth at the end of his life, when he already had amassed enough knowledge and experience to say, "I know that I know nothing." His wisdom lay in his awareness of his own ignorance and in his humility in the face of the unknown. ■