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Critical Understanding: The Changing Politics of Science

Article by Edouard Gaudot, Étienne Klein
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France was once the country of the Enlightenment. Today, it is witnessing a widespread and growing public distrust in science, to an extent unique in Europe. Argument and critique are key to democratic debate. But when you cannot agree on the facts, you soon run into trouble. Edouard Gaudot sat down with physicist Étienne Klein to discuss changing public attitudes to science and the role of education.

Edouard Gaudot: It seems that public scepticism has been growing for at least 15 years, a process which has only been accelerated by the pandemic. Are people losing trust in science?

Étienne Klein: A 2021 report by the French Council of Economic Analysis took stock of how the Covid-19 crisis in Europe has impacted the economy, mental wellbeing, and trust in science. Interestingly, trust in science has remained at 90 per cent. This figure must be taken with a pinch of salt, because it is not clear exactly what it refers to, but it is a high number nevertheless.

The question “Do you trust scientists?” can be understood in several ways. The first would be: do you believe scientists are being truthful, and if so, does this apply to all scientists or just the ones you prefer to listen to? The second meaning would be: do you trust science as a knowledge process capable of generating objective, “scientific” results? The third aspect would be: do you trust that science can meet the challenges we are facing in terms of ecology, climate, biodiversity, and so on?

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Regardless of one’s understanding of the question, trust in science has remained more or less stable in most European countries. The exception is France, where it fell by 20 points in 18 months – a huge drop. What is the reason for this “cultural exception”? Is it how science and research were spotlighted during the pandemic? Were the debates too focused on personalities? Were controversies artificially manufactured?

It seems to me that it is not so much that we don’t trust the experts. It is rather that more, and new, voices are gaining exposure. These voices would not have received a platform a few years ago. Is this some kind of democratisation in our relationship to knowledge and science? Or is it the result of confusion over what science is? My hypothesis is that we have confused science with research. The idea of doubt, which is inherent to research, has come to colonise the very idea of science.

It would represent, paradoxically, a certain progress of the critical spirit.

Critical thinking can be good and bad. Good critical thinking is when you subject your thought to criticism. All true thought is critical. “To think is to think against your brain,” said Gaston Bachelard. But if you are constantly reinforcing existing patterns of thought through confirmation bias, you can no longer really be said to be thinking. The critical spirit that I see, particularly in online comments, is more about criticising the thought of others – not your own.

How do you distinguish between the healthy questioning of information and an unhealthy conspiratorial train of thought?

We cannot immediately speak of conspiracy theories because there is a form of conspiracy theory that is hyper-rational rather than irrational. It plays the game of minimal causality: a very small number of causes explain all the phenomena before us. I once spoke to a conspiracy theorist and I was taken by their very skilful use of scientific argument that reversed the burden of proof. When asked to prove that there was a conspiracy, they replied: “Prove to me that there wasn’t one,” which was materially impossible. They argued that the absence of evidence is not evidence of the absence, which is also true, of course!

In his book *Truth and Truthfulness* (2002), Bernard Williams explains that two contradictory currents of thought exist in postmodern societies like ours, which, by a perverse effect, instead of fighting each other, feed each other. The first he called the “pleasure of truthfulness”. It is the idea that our European societies are educated and informed, and therefore the public does not want to be fooled by the discourse of power, elites, institutions, or lobbies. Obviously, a desire not to be fooled is perfectly healthy in a democracy. It should be encouraged, because it is based on the idea that there is an almost intrinsic link between knowledge and the “Republic”.

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This healthy desire for truthfulness should aim at identifying truth. What Williams shows is that, in reality, it triggers a generalised critical spirit across society that undoes the idea that there are verified truths. As soon as we come across truth, we ask ourselves whether it is true. Are there not contextual factors at play? Has this information been manipulated? The desire for truthfulness thus feeds a denial of truth, which in turn creates mistrust of the powerful: of political, institutional, and expert discourses.

This dynamic had been identified before the Covid-19 pandemic. The pandemic exposed the limits of popular science, generalised for the mass audience; it only works for those for whom it works, and many among the public have not had direct contact with scientific arguments. They drink from other sources. When I say that, I do not want to give the impression of having an elitist discourse. It’s not that there are scientists on one side and the general public on the other. Scientists themselves are competent only in and around their own discipline.

Moreover, I am not defending an academic conception of democracy; a citizen who knows

nothing about science is no less a “good citizen” than somebody interested in it. But what worries me is that there is a part of the public that can be easily manipulated and deceived. The question is, how can we reduce this risk? If we want a proper democratic conversation about technology, we’ll need to make sure that activism and participation are also backed up by prior knowledge.

At the heart of the articulation between science and power is the question of how to link scientific knowledge about facts such as biodiversity loss and climate change to public discourse and eventual action.

This is exactly what concerns me, and I don’t have any solutions. On matters of technology and ecology, my observation is that activism and competence are not necessarily correlated. In France at least, having a clear position, pro- or anti- something, seems to absolve one from the obligation of educating oneself about the matter. We hardly know what GMOs are, nor how nuclear reactors work, nor by what miracle our telephones send messages to the other side of the world. But when a pollster asks us about these subjects, we do not hesitate to answer yes or no. How can we explain this readiness? Well, we’re not making a judgment on the technologies themselves but the images with which we associate them. All technologies produce a “halo effect”, as the philosopher

Gilbert Simondon pointed out: they radiate a symbolic light, sometimes positive, sometimes negative, which goes beyond their own reality and spreads in its surroundings, obscuring perception of the technology as it is.

Behind this observation lies one of the limits of the Encyclopaedist project of the Enlightenment. They believed that the more technical objects there are within the population, the better the general understanding of the scientific principles underlying them would become. Technology would be a vector of pedagogy: it would teach, by its very presence, the sciences from which it came. Today, this is simply not the case. Even an engineering student will struggle to explain how a mobile phone works, and how a message can be sent instantly from a miraculous screen to anywhere in the world. A magical relationship to technical objects thus develops. Their ease of use is completely independent of the knowledge that we have of their functioning.

In the preface to his book *Le Contrat naturel*, philosopher Michel Serres deplored our increasingly divergent educational trajectories. On the one hand, there is education in science and the description of the world and, on the other, education in the human sciences and prescription for the world.

This is less true in Germany, thanks to the promotion of technical education and lifelong learning. But in France, there is a kind of determination that is made at a very young age. The sciences and mathematics are used to select an elite who will populate the amphitheatres of the *Grandes Écoles*, when we should be more concerned about the general educational level of the population.

Until recently, you could stop doing math- ematics in France at 16. You try it out, and if you don’t do well then that’s it for life. I’ve taught different types of audiences and I can tell you that these are glass ceilings. They prevent certain people, however intelligent, from ever moving past the traumas of school and believing that they are even capable of thinking

about science.

In an ideal world, what would the European education system look like? What should we have learned by the time we leave school?

The question of what to teach students is delicate, because all knowledge is available on the internet to anyone who wants it. What can we teach them that they can't find out for themselves?

I think that teaching should therefore focus on learning. You should learn to calculate, to write, to understand, to reason. Alongside laying the foundations to learn later by oneself, we should try to distil what Einstein called the "eroticism of problems", a way of presenting things that creates an addiction to emotions, stories, characters, and paradoxes around knowledge. It would be a way to exploit the deep, insular joy that arises in the mind when you finally grasp something you have been making an effort to understand. Understanding, finding the key to a discovery, or verifying an elementary physical law: this is what moves you and takes you away from your usual ways of being in the world. Without it, we'd be left with poor knowledge that is hard to even distinguish from beliefs.

This is why, a few years ago, I suggested to [former French Education Minister] Luc Ferry that we should teach each year, from kindergarten to the end of primary school, the story of a discovery. The real story, not the legend: what were the arguments, why at one point did almost everyone agree? This class would be compulsory, but it would not be graded. This would make it possible to learn, from specific examples, the difference between knowledge and belief.

Can we democratise science? Can we have a citizen science without impoverishing science?

I do not like to speak of the "democratisation of science". It is so ambiguous. This formulation suggests that science is inherently democratic or could become so. However, it is not, nor does it want to be. Scientific results cannot be determined by a vote. David Hume said that truth is the one limit to the sovereignty of the people. If a large majority of people decide that Earth is at the centre of the solar system and that the sun revolves around it, it will not make any difference to the real motion of the planet around the sun.

The right of citizens to ask questions, investigate, hold opinions, and challenge researchers and governments nevertheless remains absolute. Their questions should be answered as honestly as possible. But having an opinion is not equivalent to knowing whether a scientific statement is true or false.

Moreover, the independence of scientific truth takes nothing away from individual freedom: neither Newton, nor Darwin, nor Einstein were potential dictators. On the contrary, it protects freedom, at least in a democracy. Because when power lies, deceives, or is mistaken, the individual can claim this truth to contest it.

What about AIDS research, for example? Immense progress has been made as a result of patient pressure.

Yes, but this is participatory science. France has done the same thing for biodiversity, with

censuses of endangered species, for example. These are people who are not in the laboratories but who help to develop knowledge through personal work that is collected, pooled, and then analysed by others. Patients with a new disease, therefore partly unknown, acquire knowledge, which can help doctors, steering them towards avenues that they may not spontaneously have considered.

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When we speak, admittedly wrongly, of democratising science, we are indeed talking about democratising the power that science provides.

Yes. Encouraging people to take part in science is a great initiative. It allows us to understand its various methodologies.

In this regard, the pandemic was a historic opportunity to explain scientific methodologies to the general public in real time. For example, we could have explained in a very accessible way what constitutes a double-blind trial, a randomised trial, the placebo effect, or the appropriate use of statistics, which can be very counter-intuitive. Remember Angela Merkel's patient, now-famous explanation of the "exponential function" at a press conference. That sort of education should have been on the evening news everywhere.

Ultimately, can we entrust government to scientists?

No. Science produces knowledge, but it also produces uncertainty – a very special type of uncertainty. We cannot know from scientific knowledge alone what to do with it. Biology has shown us how to make GMOs, but it doesn't tell us if we should or shouldn't do so.

Science today is no longer embedded in the idea of progress. The word "progress" itself is used less and less. It has almost disappeared from public discourse, to be replaced by the word "innovation". One could say that this switch did not change anything, because these two words are, in a sense, almost synonymous. But on examination, it appears that our discourse on innovation is a radical departure from the rhetoric of progress. To believe in progress was to agree to sacrifice the personal present in the name of a certain idea, credible and desirable, of a collective future. But for such a sacrifice to have meaning, there needs to be a symbolic attachment to the world and its future. Is it because such a connection is lacking today that the word progress has disappeared or is cowering behind the concept of innovation, now on the agenda of all research policies?

If you listen to a lot of today's discourse, what is most important is not innovating to invent another world but preventing the disintegration of the one we have. It is the critical state of the present that is invoked and not a certain configuration of the future, as if we were no longer capable of enunciating an attractive common purpose. This argument is based on the idea of a time that corrupts, a time that damages beings and situations. Yet such a conception turns its back on the spirit of the Enlightenment, for which time is, on the contrary, a constructor and accomplice of our freedom – provided, of course, we make the effort to invest in a certain representation of the future.

It is up to citizens to determine what they wish to build with new technologies. Many are calling for debate. But the very idea of debate in a world of polarised opinions, with little knowledge, is difficult to put into practice. How can we organise instructive debate involving citizens and experts? Where do we draw the line between popular science, citizen participation, and political power? What we need is for competent people, who are generally moderate, to get involved wholeheartedly.

Edouard Gaudot is a historian and political scientist. He has worked at the College of Europe in Warsaw and in the European Parliament. His most recent publications include *Dessine-moi un avenir* (Actes Sud, 2020) and *Les 7 piliers de la cité* (Plon, 2022).

Étienne Klein is a physicist and philosopher of science at the École centrale Paris. One of his main focuses is communicating science to the general public, especially quantum physics and particle physics.

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