

THE PANDEMIC AND THE « TECHNO-FIX »¹

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Abstract

The current pandemic was an announced possibility. Its possible causes were known: destroyed ecosystem niches, declining biological diversity, intensive farming, abuse of genetic and biologic manipulations. This paper deals with some aspects of the biological (and social) history of the ongoing Covid-19 pandemic but also with the history of previous epidemics, including the AIDS epidemics, which all have in common to be highly linked, enhanced or even the result of human activities. But now, the myth is setting in that an innovative technique for fast production of vaccines is the only AND SUFFICIENT response to the crisis in the ecosystem and in health structures, of which this pandemic is a symptom. Anti-scientific approaches to the ecosystem and human biology are feeding the idea that the natural world may be resilient indefinitely. This is unfortunately not the case and this article calls for a critical thinking about the technosphere and its limits as well as for new frameworks of biology, medicine and culture.

Keywords: pandemics, vaccine “techno-fix”, technocracy, DNA-centric vision, human and ecosystems

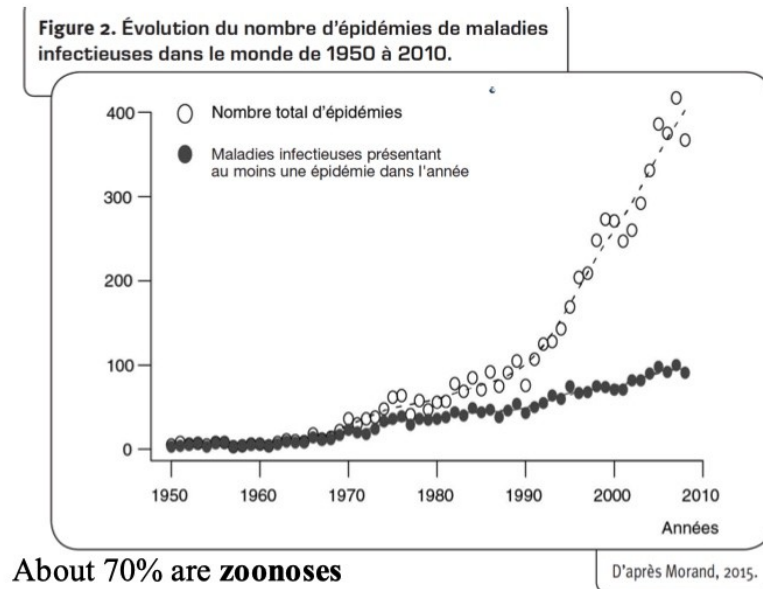
Introduction

The world and our lives have been turned upside down by an expected pandemic. In fact, since 1993 experts have been denouncing an "epidemic of epidemics". A well-documented 2015 book (Morand, Figuié and Coord, 2016)² and numerous articles have subsequently updated the data on this phenomenon, which can be summarized in this graph (Morand, 2015) :

1 To appear in **Organisms, Journal of Biological Sciences**.

2 Free download here: <https://www.quae.com/produit/1365/9782759224920/emergence-de-maladies-infectieuses>

Number of *epidemics* from 1950 to 2010 (Morand, Figuié (coord.) 2015).



Surveillance of epidemics, epizootic and zoonoses has increased since the 2000s when the OneHealth's approach started to be promoted (Stephen and Karesh, 2014). Governments are aware of the threat posed by this increase in epidemics, some of which have the potential to turn into a pandemic nightmare at lightning speed due to the huge, rapid and now uncontrollable human flows. They have taken seriously previous WHO warnings about the risk of an influenza pandemic. First, in 2005, an epizootic of H5N1 avian influenza in intensive poultry farms in Asia caused a zoonosis that infected 114 people, 59 of whom died. Fearing that this zoonosis could lead to the emergence of a human-to-human transmission influenza virus by crossing the species barrier, 120 million birds died in three months, most of them suffering from flu or having being sacrificed as a precaution (Ligon, 2005). States have adopted prevention plans and stockpiled antivirals, in particular tamiflu, and masks. They also prepared in 2009, when the WHO announced a risk of a human flu pandemic due to the H1N1 influenza virus, by prioritizing the production of new vaccines on an emergency basis (Mereckiene *et al.*, 2012).

The dreaded pandemic finally arrived in 2020. It took the whole world by surprise because it did not come from the flu virus as expected, but from a new Severe acute respiratory syndrome coronavirus (SarsCoV) that emerged at the end of 2019 in China. The States were not prepared for this pandemic (not enough masks, problem of PCR reagents....). They accelerated the pace of research and bet everything on vaccines, in particular mRNA vaccines quickly obtained by a new technology. That technology lacks scientific knowledge in agreement with evidence-based medicine and gives the illusion of being able to control the circulation of a virus already dispersed throughout the world. The results are not up to their expectations but this does not seem to taint the logic of technology as a unique solution to face this health crisis. This ignores the well-identified causes of these repeated outbreaks,

the limits of their solution, and their possible consequences for the future, as they choose to ignore the established knowledge of medical virology. Everything is focused on a quick and miracle technical solution: this new mRNA vaccine technology, relatively easy to produce but whose potential harmful effects are unknown. In the urgency of the first wave of the epidemic, protecting the elderly or those vulnerable by comorbidities was clearly justified. Unfortunately, the effectiveness of vaccines seems short-lived, with boosts required every three months or so. Despite this, the only medical solution adopted for all categories of the population remains the vaccine as a « techno-fix », which is seen as a magic bullet solving all problems. Thus leading to a lack of analysis of their causes, which are rooted in a distorted and anti-scientific relationship with the ecosystem, with people, as well of the role of the health systems. In many cases, the failure in protecting lives was due to unprepared medical structures to face the slightest emergency.

We now need measured scientific and medical responses that do not rely on techno-science alone. It is typical of techno-science to deny its own limits, which are precisely based on a reductionist vision of the living world, where an “alphabetical combination” of DNA could be manipulated as much as you like. We also need to act urgently at the root cause of these repeated outbreaks and transform our relationship with nature. Governments must empower themselves to act according to the concept of OneHealth³, beyond the buzzword. The direct contribution of humans to this inflation of epidemics is already a reality, as shown by examples mentioned in this article. This calls for critical thinking about the technosphere and going beyond the dominant explanatory frameworks of biology, medicine and culture.

An epidemic of zoonotic origin in 70% of cases over the past 50 years

After century of very significant decline in the number of epidemics, particularly but not only in Europe, what happened over the last 50 years? World population doubled and there was an eight or nine-fold increase in epidemics, which have been very well documented since the end of the 19th century. About 70% of these recent epidemics have been the result of "zoonoses", *i.e.* they are due to microorganisms passing from animals to humans (more generally called 'spill-overs'). Among the many causes of this astonishing growth in 'spill-overs', deforestation and human encroachment on natural habitats associated with an unprecedented loss of biodiversity in human history top the list. Often, this is made worse by the creation of huge intensive livestock farms near these critical areas, which serve as perfect incubators for diseases or novel mutations thereof. Finally, laboratory accidents, medical procedures and human genetic manipulations are also responsible for these outbreaks.

This is the case with the last major pandemic, AIDS, which is still raging around the world. AIDS is caused by two emerging viruses, HIV-1 and HIV-2, that are the product of several independent zoonotic transmissions of the simian immunodeficiency virus (SIV) from

³ Initiative supported by World Health Organization (WHO), Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE). <https://www.who.int/news-room/questions-and-answers/item/one-health>

monkeys to humans in the early 20th century (Hillis, 2000; Korber *et al.*, 2000). These zoonoses, coming from different species of monkeys, are not directly pathogenic for humans who have lived closed to these monkeys in the depths of the jungle for thousands of years (Poulsen *et al.*, 2000; Lemey *et al.*, 2003; Keele *et al.*, 2006). However, these alone do not explain the origin of the AIDS pandemic, since emerging HIV viruses subsequently acquired human-to-human transmission properties (Marx, Apetrei and Drucker, 2004). Several simian viruses transmitted separately, and simultaneously, to humans in African colonies at the beginning of the 20th, led to the various groups of HIV-1 and HIV-2 (Hahn *et al.*, 2000; Korber *et al.*, 2000; Damond *et al.*, 2004; Santiago *et al.*, 2005). Large-scale colonial construction projects leading to deforestation, massive population displacements, urbanization and rapid socio-cultural changes have contributed to bring the virus out of its natural forest habitat. Colonial medicine organized massive vaccination campaigns, and later antibiotic treatments by injection, or carried out blood transfusions with re-usable syringes, including in SIV reservoir places. This medicalisation was most probably a determining factor in the cross-species transmission of simian viruses and their iatrogenic spread by blood contamination through syringes that were used in many consecutive people without intermediate sterilisation.

All these factors, which have contributed to the adaptation of the simian's SIV to humans over a short period of time are the result of human activities, including medical and altruistic ones (Chitnis, Rawls and Moore, 2000; Drucker, Alcabes and Marx, 2001; Marx, Alcabes and Drucker, 2001; Apetrei *et al.*, 2006; Schneider and Drucker, 2006; Pépin, 2021).

While the AIDS pandemic is emblematic of the end of the 20th century, less famous epidemic episodes are more and more frequent. Among these episodes, the coronaviruses have been on alert for two decades with several emergencies under close surveillance. First in 2002, a major epidemic of Sars-CoV caused great concern with the death of 800 people, out of 8 000 cases recorded in some thirty countries (Drosten *et al.*, 2003; Fouchier *et al.*, 2003; Ksiazek *et al.*, 2003; Zhong *et al.*, 2003). This new disease comes from an emerging coronavirus that has been transmitted by small carnivores, civets, sold in bushmeat markets in southern China (Guan *et al.*, 2003; Song *et al.*, 2005), but the wild reservoirs of the virus are most likely bats (Hu *et al.*, 2015).

Then in 2012, in the Arabian Peninsula, a first human case of infection with a new coronavirus, causing the Middle east respiratory syndrome (MERS), was identified with cases of human-to-human transmission imported into Europe, in Asia and the United States (Zaki *et al.*, 2012; Hemida *et al.*, 2013). The virus was transmitted to humans by camels, contaminated from bats which are the reservoir of the virus (Alagaili *et al.*, 2014; Sabir *et al.*, 2016).

These examples are highlighting the fact that the changes which have happened over the last century at unprecedented speed and scale, all of them originated from anthropic activities threatening the biodiversity, diffused also by badly handled technologies, give ideal situations to the emergence of new pathogens and enhances the probability of the

spreading of unknown infectious diseases for which medicine is deprived *a priori* at a first step (Keesing *et al.*, 2010; Morand, Krasnov and Littlewood, 2015) .

Accidental outbreaks of pathogens escaping from laboratories

Numerous pathogens have accidentally escaped laboratories, a phenomenon documented worldwide and denounced for a long time.

In 1967, a few people were infected during a micro-epidemic in Germany with the Marburg virus, which belongs to the same family as the highly lethal Ebola virus, while handling tissue from grivet monkeys imported from Africa (Ristanović *et al.*, 2020). Many other accidental episodes involving a wide range of pathogens have been reported (Heymann, Aylward and Wolff, 2004; Furmanski, 2014). These laboratory leaks have killed hundreds of people in total, but none of them have gone beyond the geographically circumscribed outbreak, with the exception of the 1976-77 flu.

This H1N1 pandemic originated from a virus strain that circulated in the 1950s and had disappeared. Since the 1950 and 1977 influenza viruses are genetically very similar, the hypothesis of an escape of the 1950 viral strain, preserved in a laboratory, is highly probable (Nakajima, Desselberger and Palese, 1978; Scholtissek, von Hoyningen and Rott, 1978). The re-emergence of the H1N1 virus was first detected in Russia and China, but analysis of frozen biological samples and subsequent phylogeny methods showed that it was present some months earlier, making it impossible to trace back to the country where the accidental re-introduction of the virus took place (Wertheim, 2010). Fortunately, this pandemic, which mainly affected young people, was no more deadly than seasonal flu thanks to the collective immune memory of the epidemics of the 1950s (Kilbourne, 2006).

But it illustrates that human error can turn into a nightmare if more virulent pathogens escape and that science-fiction disaster scenarios could become reality (Klotz and Sylvester, 2012). Among them, coronaviruses gained attention in 2002 with the emergence of Sars-CoV, which was placed under close surveillance with monitoring of highly pathogenic infections. Its zoonotic origin as well as the animal reservoirs that harbor it have been established (for a review, see for example (Cui, Li and Shi, 2019). Most of the 8,000 cases identified are the result of a chain of human-to-human transmission. However, at least 4 laboratory accidents resulting in human infections with the same virus were reported in Asia in 2002 and 2003, one of which resulted in secondary infections, one of which was fatal (Heymann, Aylward and Wolff, 2004). This shows that manipulating this type of virus in the laboratory is at high risk of exit from the laboratory.

Following the Sars outbreak, investment in research on coronaviruses, now identified as having a high pandemic risk, was significant but patchy and not sustained over time. And relatively limited, considering the high profile of the Sars epidemics (Head *et al.*, 2020).

In early 2020, governments around the world were helpless when faced with a devastating pandemic that was rapidly becoming global. The pathogen, an emerging Sars-Cov, was quickly identified, related to Sars-Cov and named Sars-CoV2. Its origin was soon officially declared to be a zoonotic virus from its animal reservoir, the bat, with the pangolin as an

intermediate host, in which it would have acquired its human-to-human transmission properties. But many elements are missing from this explanatory puzzle and the examination of this hypothesis involves geopolitical issues that complicate the work of experts. In the case of Covid19 pandemic, "accidental laboratory leakage" is high on the list of possible origins of SARS COV-2 2 (Decroly, Claverie and Canard, 2021; Sallard *et al.*, 2021a). Some authors even consider that the most imminent danger today comes more from the manipulation of this type of virus in the laboratory than from the new natural and recurrent zoonoses, that are most often dead-end infections (Klotz and Sylvester, 2012; Lipsitch and Bloom, 2012).

Moratorium on « gain-of-function » experiments

If the hypothesis of an accidental escape of a laboratory virus were to be confirmed, the question of whether this SarsCov-2 strain, which caused the 2020 pandemic, is natural or not, arises. In particular, the presence of a furin site, which is absent in other Sars-CoVs (Coutard *et al.*, 2020), raises the question of whether this site could have been introduced by humans through genetic manipulation as part of gain-of-function genetic research (Sallard *et al.*, 2021b).

This type of experiment, which consists in increasing the virulence, or the infectivity, or both, of a virus, has divided scientists for a decade, after genetic manipulations of the flu virus were carried out in several laboratories (Imai *et al.*, 2012; Russell *et al.*, 2012). Opponents of these experiments consider that the benefit/risk ratio is very unfavorable and that by playing with fire, with the intention to be prepared for a pandemic, they risk producing precisely the feared pandemic, like a "self-fulfilling" prophecy" (Zimmer and Burke, 2009; Klotz and Sylvester, 2012; Lipsitch and Bloom, 2012; Wain-Hobson, 2013). In 2012, the US government listed 15 pathogens and toxins for which certain types of research are subject to new safety rules. The aim is to better control experiments on these pathogens for their dual-use research potential⁴. Scientists' warnings about the danger of gain-of-function experiments reach the highest political levels, including in Europe (Enserink, 2013).

In 2014, following three separate laboratory incidents reported by the CDC, over 200 scientists signed the Cambridge Working Group declaration asking for a cessation of experiments on potential pandemic pathogens⁵. Indeed the Obama administration imposed a moratorium on gain-of-function studies on influenza, SARS, and MERS⁶ (NIH, 2015). This moratorium, which was relatively respected, lasted only three years (NIH, 2017) and new

4 [United States Government Policy for Oversight of Life Sciences Dual Use Research of Concern](#), 2012

5 [Cambridge Working Group Consensus Statement on the Creation of Potential Pandemic Pathogens \(PPPs\)](#), July 14, 2014.

6 [United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern](#), 2014.

funding procedures, framing the gain-of-function experiments⁷, were enacted in January 2017 (Burki, 2018; Klotz and Koblenz, 2018).

Lastly, the origin of HIV AIDS viruses in the 1920s in the depths of central Africa at the origin of the pandemic from the 1970s onwards has been established (Pépin, 2013) while the emergence of a new virus only two years ago in China has still not been elucidated despite the vastly improved technological sequencing capabilities available over the last decade.

Technology as the only solution to recurring pandemic threats?

What is being done about these new threats and their various human-made causes, which have their common origins in a techno-science that destroys both the ecosystem and science? Some have - again - proposed a technical solution, a quick "techno-fix" serving as a molecular "magic bullet". This is so that we can forget to reflect and work on their causes that are rooted in this distorted and anti-scientific relationship with the ecosystem and human beings.

In itself, the invention of messenger RNA vaccines is an innovative and very interesting technical possibility. The understanding of RNA has long been delayed by the dominant DNA-centric vision (according to which everything is played out at the level of DNA). This narrow vision has prevented for too long the funding of heterodox research, coined by many as "epigenetics", which has been proposed since the 1990s, for example by Katalin Karikó in the USA, a pioneer of these studies on RNA (Sahin, Karikó and Türeci, 2014), or by Bruno Canard in France⁸ (Canard, 2020). Moreover, it did not promise anything profitable in the short term. However, in face of the pandemic and once corporate actors understood the potential financial gains of this technology, gigantic pharmaceutical companies, such as Pfizer and others, grasped the value of these possible RNA-interventions. Then quickly repurposed the RNA intervention platforms towards a vaccine against COVID-19, the foundations of which had been developed by a few small 'start-up'-style laboratories - that were in fact working on cancer mono-antigenic immunotherapies (BioNTech), unsuccessfully to date. This was only possible due to very substantial public funding, that was never repaid to date despite record profits. These technical interventions, *i.e.* vaccines, applied first on elderly or fragile individuals, may have saved hundreds of thousands of lives, according to many government and health authorities.

But ... now what? Will we reflect on the causes of this dramatic increase of epidemics, which are now easily becoming pandemics? Will we resume the commitments, made in the early months of its spreading, to the public health infrastructure? Everyone remembers the recognition by our governments of the needs of hospitals so long neglected, transformed into business enterprises, in which every "act of care" had to be evaluated first financially

⁷ [Framework for Guiding Funding Decisions about Proposed Research Involving Enhanced Potential Pandemic Pathogens](#), 2017.

⁸ <https://academia.hypotheses.org/20902>

and in the short term, including the storage of masks. We also remember how health care workers took control of their core business by adapting to the situation at the beginning of the pandemic, at great personal expense and against the financial priorities imposed on them. For a few months, hospitals prioritized medicine before financial optimization and governments recognized the needs of community medicine, which was unable to provide care on an outpatient basis or at home. All this now seems forgotten, there is only "the vaccine" and any critical discussion on this subject is conveniently condemned and labelled as an anti-vax position whereas the hesitation about COVID-19 vaccination is based more on rational arguments than on *a priori* irrational positions (Schwarzinger *et al.*, 2021).

Technoscience's denial of its own limitations

The effectiveness of messenger RNA vaccines in protecting the elderly or vulnerable has been stressed and pointed out by many colleagues and institutions. But it is typical of techno-science to deny its own limitations.

So, we should now vaccinate everyone, including children who are almost never at risk themselves for becoming seriously ill from SARS COV-2, in fact the whole world should receive these short-lived vaccines as the only way out. An absurd idea that billions of people could be vaccinated on a biannual basis or even more frequently. Moreover, in the absence of data consolidated by time and sufficient hindsight, only limited considerations of the benefit/risk balance seem reasonable. For people who are vulnerable because of their age or co-morbidities, the potential benefit, even in the absence of such data, may justify the governments' incentives to vaccinate them, before the final approval of the vaccines (by FDA or EMA), an approval that is still awaited, as it is conditioned by a methodology established to provide a sufficient level of scientific proof (Doshi, Godlee and Abbasi, 2022). For other people, those for whom the chances of serious consequences of SARS COV-2 infection are very low (and we know this since May 2020, through confirmed observations (Ioannidis, 2021)), the benefit of the vaccine is questionable, especially when the risks are still unknown. All the more so as, today, the virus is in the process of becoming endemic: more contagious but less pathogenic, it tends to be similar to the four endemic coronaviruses that have already been in circulation for decades or centuries (Lavine, Bjornstad and Antia, 2021; Sonigo, Petit and Arhel, 2021; Murray, 2022).

To develop and devise future strategies that are indeed sustainable in light of the soon to be endemic nature of SARS COV-2, it is mandatory that the success of these vaccines must be seen in the context of their limitations. In vain, some scientific articles have shed light on the fact that even vaccinated people can efficiently transmit Sars-Cov2 infection including to fully vaccinated people (Singanayagam *et al.*, 2021). The sanitary passes (or 'certifications') are therefore barely, if at all, effective against the spread of the virus, whereas hygiene measures, including masks, are helpful in protecting against Sars CoV 2. Prevention around food and beverage handling is very important too.

Instead, we are observing that we – as a human collective – are falling into the fallacy of deeming ourselves in control of viruses if only the whole world – regardless of their

vulnerability – participates in the technical solution (a “techno-fix”), this time in the form of an experimental vaccine. So, many politicians, while insisting on “herd immunity” for months (at 70% of the population), now accuse the unvaccinated 10% for the continuing crisis. And this, while the treadmill of more and more zoonoses following deforestation and persistent encroachment of natural habitats or laboratories carrying out gain-of-function research with potential pandemic pathogens continue unabated.

Similarly, the degradation of our health systems continues, with increasingly insufficient human and financial resources. The answer is instead based on new vaccines ... We have a powerful and easily adjustable technology, we can go ahead without any sense of limits; faced with ecosystemic and medical challenges, we only have to ... produce a new vaccine. Its effectiveness lasts three months? Not a problem. Quite the contrary: it is a perfect business model. We don't know the long-term effects of the RNA-based technologies, administered to colossal quantities of individuals? Let children and young people be vaccinated and keep quiet and let scientists who try to highlight the limits of this new technique be classified as anti-vax. With no meaningful change in the drive for efficiency, as well as for safety, in medicine and research based on "profitable projects", we should expect to see more of this techno-science "solution" with big promises based on little knowledge. This is a response based on the same anti-scientific attitude which, through its action on ecosystems or molecular manipulation based on the flawed vision that organisms are built with Lego-like DNA blocks, is at the origin of almost all the epidemics of the last decades which sometimes transformed into pandemics.

So, the engines that may generate pandemics continue at full speed and, undoubtedly, the next pandemic is already in the making. In fact, we will be lucky if it does not break out before this one has finally become endemic.

A failed conception of the living world

From the scientific point of view, most of these manipulations, whether the intensive destruction of ecosystems or done in laboratories, are based on a techno-scientific vision of organisms. A vision which is based on an “alphabetical combination” view of DNA, which is seen as a “computer program” or “code” of life that can be manipulated at will – with little if any understanding about the organism, its ecosystem and its history⁹.

In both cases -zoonosis or loss of control over genetically manipulated pathogens- the root cause is our past and current relationship with nature. It is this relationship with nature that many of us¹⁰, are calling to change from the bottom up if we are serious about preventing future pandemics, and more generally, if we want to preserve a viable life on the planet. But,

9 <https://republique-des-savoirs.fr/events/event/rencontre-cardano-v-la-nature-et-ses-souvenirs-la-revolution-combinatoire-de-la-biologie-et-ses-dangers/>

10 See the Association of Friends of the Thunberg Generation (AAGT, <https://generation-thunberg.org/accueil>), the European Network of Scientists for Social and Environmental responsibility (ENSSER, <https://ensser.org/>) and the Cardano Group (<https://cardano.visions-des-sciences.eu/>)

instead of understanding biology in its evolutionary and historical context including all its diversity and singularities, we treat plants, forests, animals ... and humans, as machines, constructed by the gears of Descartes and Bacon's clocks, which still serve as the main reference for the inventors of the first bio-technologies (Hartley, 1937). For the more modern ones, they are considered to be driven by a software, the DNA, which can be programmed and reprogrammed at will. This is not only a scientifically flawed assumption but also a dangerous one as the current pandemic, probably, and many previous failures or unrealized promises, certainly, illustrate (Longo, 2021).

Conclusion

We need to think better, and collectively, about this debacle and future possible ones. There is an urgent need for more expertise than is currently present, which consists mainly of virologists and epidemiologists. In particular, more knowledge is needed in the disciplines that understand the various ecosystem or laboratory (genetic) origins of epidemics and their countermeasures and can propose new research guidelines and directions. Rapid technical responses are only palliatives which confirm a flawed logic but are financially hegemonic; even in the emergency, investments and research on medical care and multi-antigenic vaccines must proceed in parallel. Precautionary, broad measures taken ahead of time addressing the root causes of pandemics will allow us to avoid the hasty and risky ad-hoc emergency actions we have seen with this pandemic. Building on the theoretical and practical knowledge of a broad range of experts and actors, who aim to look after the biosphere while fostering critical thinking about the technosphere, seems to us the way forward. This way, we may avoid a repetition of the current debacle.

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