QUADERNO

"LA RIFLESSIONE BIOETICA DI FRONTE ALLA CRISI PANDEMICA DEL COVID-19"
"THE BIOETHICAL REFLECTION FACING THE COVID-19 PANDEMIC CRISIS"

Science as a weapon of mass distraction (the virus warfare)

La scienza come arma di distrazione di massa (la guerra del virus)

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With the COVID-19 pandemic the relationship between science and warfare seems to have scaled up to a new level. In the current information war, science seems to be used as the weapon itself, instrumentalized by different parties featuring diverse vested interests with the aim to advance their agendas.

In such circumstances information may be manipulated in several ways. The paper ranks different forms of "persuasion" in ascending order, from paternalism to full-blown authoritarianism, as exemplified by various episodes during the COVID-19 emergency. Finally, it advances some proposals regarding science policy approaches, in particular the development of virtuous mechanisms that reward overall public and individual health, instead of just reimbursing interventions (with the consequent spiral of increasing insurance costs). As Tallacchini (2019) underlines, authoritarianism and nudging are not the only possible routes to be explored. A third way is a new confidence pact between institutions, private sector and citizens, and a new Hippocratic Oath between patients and doctors, fostered by the right mechanisms, both for the social planner and for the entrepreneur, in view of the long term wellbeing and welfare of the population. If someone needs to be nudged, this is those who hold the power in the system of asymmetries characterizing complex societies, not the vulnerable, whom the State should defend from abuses of power, of any kind.

Key words: Scientific uncertainty, Evidence standards, Expert knowledge, Regulatory capture, Science tyranny, Epistemic asymmetries, Information wars, COVID-19.

Con la pandemia COVID-19 il rapporto tra scienza e guerra sembra aver subito un incremento di scala. Nell'attuale guerra delle informazioni, la scienza sembra utilizzata come un'arma essa stessa; strumentalizzata dalle diverse parti in conflitto con interessi costituiti di varia natura, al fine di attuare la propria agenda. In tali circostanze l'informazione può essere manipolata in vari modi. L'articolo ordina in modo ascendente queste forme di "persuasione" a partire dal paternalismo, fino a espressioni dittatoriali a tutti gli effetti, esemplificate da vari episodi accaduti durante l'emergenza COVID-19. Infine si avanzano alcune proposte relative alla politica della scienza, in particolare verso lo sviluppo di meccanismi virtuosi che premino la salute pubblica e individuale nel suo complesso, invece di rimborsare interventi (con la relativa spirale di crescita dei costi assicurativi). Come sottolineato da Tallacchini (2019), autoritarismo e "nudging" non sono le uniche possibilità da esplorare. Una terza via può essere quella di un patto di fiducia tra istituzioni, settore privato e cittadini, e un nuovo giuramento ippocratico promosso dai meccanismi regolatori che incentivino sia il pianificatore sociale che l'imprenditore a migliorare il benessere della popolazione e il welfare. Se c'è qualcuno a cui vanno rivolte le politiche di "nudging", questi è colui che detiene le leve del potere nel sistema di asimmetrie caratteristico delle società complesse, non chi si trova in posizione di vulnerabilità, che invece lo Stato è chiamato a difendere da abusi di potere, di qualsiasi tipo.

***Parole chiave**: Incertezza scientifica, Standard di prova, Conoscenza degli esperti, Acquisizione normativa, Tirannia scientifica, Asimmetrie epistemiche, Guerre informative, COVID-19.*

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Introduction

Science and warfare have always been having a tight relationship, unfortunately. That the pursuit of truth bears with it the negative externality of mass destruction and death seems paradoxical, but a deeper look just reveals the Janus character of any human activity and social institution.

With the COVID-19 pandemic however, this relationship seems to have scaled up to a new level. Whereas until now science had been the instrument for producing more and more sophisticated technologies for defense and attack; in the current information war, science seems to be used as the weapon itself, instrumentalized by different parties featuring diverse vested interests with the aim to advance their agendas, obviously not necessarily to the benefit of the citizen, or humanity. The citizen, overwhelmed by an unmanageable quantity of fragmented and contradictory information, and at the same time oppressed by the severe limitation of elementary human rights through various measures of lockdown and confinement, is baffled by the uncertain mid and long term economic and social prospects of the epidemic. All the more, since scientific uncertainty both affects the estimation of such prospects and undermines the epidemics mitigation measures.

Such uncertainty is exacerbated by the awareness that knowledge producers themselves have vested interests, and by the fact that policy makers, if "captured" by lobbyists and interest groups, may become biased social planners: i.e., they may not act in the interest of the population, but rather reflect the aims of interest groups and ideological movements in direct contrast with the normal democratic functioning of the Res Pubblica.

Reliance on task forces of experts does not solve the issue, but rather aggravates it: 1) bias is only shifted one step further: experts might represent on their turn specific interest groups and steer the social planner towards policies that benefit their own agenda rather than the public wellbeing; 2) being non-democratically elected, experts are even less accountable towards the population, than policy-makers themselves, and may serve the purpose of buck-passing the blameworthiness for unwelcome measures.

In issues of Science and Technology, policy-makers may be (unconsciously) "captured" because of the intrinsic opacity of scientific knowledge. This phenomenon may be exacerbated in cases where experts themselves are extremely insecure or in reciprocal contradiction, all the more if they ask for legal immunity. In any case, the policy makers may be (perceived as) non-benevolent, and therefore untrustworthy, not only with regard to their decisions, but also with regard to the information they provide.

Indeed, in such circumstances information may be manipulated in several ways in order to persuade the receiver to act in one's preferred way[1]. In a scale from weaker to stronger forms of "persuasion", via using science and scientific uncertainty, we can register the following (non-exhaustive) list of possibilities:

1. *Paternalism*: e.g. governmental and related official institutions are presented as the only reliable sources of information for the right course of action ("They know best");
2. *Censorship and selective reporting*: scientific information that goes against the governmental agenda is silenced;
3. *Exploiting and artificially inflating scientific uncertainty* by disqualifying the *reliability* of the *source*, *methods* or underpinning scientific *theories* that go against the governmental agenda;
   3.1. Double standards: raising or lowering methodological standards depending on the evidence content and its implications for policy decisions;
   3.2. Disqualification of opponents' theories without entering into the subject, just by stigmatizing them as "conspirationist";
   3.3. Blame Game (e.g. *ad hominem* arguments against scientists);
4. *Scientific propaganda:* public relations activities and monopolization of the mainstream media agenda;
5. *Scientific fraud*: e.g. promoting the publication of fraudulent studies in order to undermine opponents' argumentation and available evidence;
6. *Authoritarianism*:
   6.1. "Scientific lockdown": Suppression of scientific investigation (e.g. discouraging or prohibiting autopsies);
   6.2. Suppression/obstruction/delay of non-lucrative and therefore less preferred clinical practices (e.g. plasma therapy, hydroxychloroquine);
   6.3. Use of deaths in order to retaliate the opposition and silence it;
7. *Malevolent social planning*: enactment of malevolent policies that are irrational from the point of view of the population's wellbeing in the short, medium or long term, because of more or less hidden agendas;
8. *Information wars*: violation of patency rights, classified research leakage;
9. *Science tyranny*: the "Therapeutic State".

In the following we will give examples of such strategies and comment on their epistemological status and implications, by giving more emphasis to phenomena of epistemic interest. A discussion on their serious consequences concludes the paper.

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[1] The game-theoretic literature offers examples of such strategic interactions in the sciences (see for instance (Hedlund, 2015, 2017; Felgenhauer and Loerke, 2017; Kamenica and Gentzkow, 2011; 2016, 2017; Henry, 2009; Kolotilin, 2014; Herresthal, 2019).

Paternalism

To start with an example of such science in trench, we analyse the divulgation activity on the COVID-19 pandemic by the popular virologist, Roberto Burioni (Professor of Microbiology and Virology at the Faculty of Medicine and Surgery of the University Life-Health San Raffaele in Milan). His attitude toward the COVID-19 case has been rather volatile, starting by fully excluding that the epidemic could reach Italy until the end of January, i.e. at a time when countenance measures – labeled as discriminatory against the Chinese people by the Government and the WHO – could have possibly attenuated the impact of the epidemic in our country, and ending with the full support of Draconian measures of countenance, such as complete and prolonged lockdown.

Burioni's declarations manifest several of the (possibly unconscious) manipulatory strategies listed above. For instance, on March 22, in one of his regular interviews at the Infotainment program "Che tempo che fa" (anchored by Fabio Fazio); Burioni states and prophesizes: "People believe in what they wish for. We all desire that a treatment arrives, which wipes away the disease, and we all would like to hear this good news. The good news will not arrive from the social media. It will arrive from the authorities"[2].

This declaration reveals a series of misunderstandings regarding scientific authority, which critically compromise rational interventions in conditions of severe uncertainty, and may be exploited by the authority to paralyze dissent and deprive citizens of their civil rights[3].

Let's analyse the epistemological implications of this declaration. First of all the blame of wishful thinking ("People believe to what they wish") misses, or better, reverses the point of the issue. Although it is true that we tend to believe what we desire and hope, it is also true that desires and hopes ground any of our decisions. Desires express our system of preference, which is an essential component of rational choice. The essential point here however is, obviously, the element of uncertainty intrinsic in the notion of desire: (Frank Ramsey sensibly stated in Truth and Probability: "No one feels strongly about things he takes for granted") (Ramsey, 1926).

Hence, uncertainty about the efficacy of available treatments (e.g. hydroxycholoroquine, convalescent plasma therapy (CPT), heparin, or ivermectin), constituting an alternative to the usually most cherished but yet-to-be-discovered one (i.e. vaccine) and/or to lucrative treatments (e.g Remdesivir) by the majority of the expert, is used to disqualify them as non-existent".

In order to do this, however, the expert must also dismiss the available evidence concerning such available treatments as "insufficient" or inadequate (see Section 3), and self-credit themselves as the only reliable source of information regarding the available therapeutic options.

The opacity and inaccessibility of scientific information for the lay audience does not allow them to evaluate the reliability of conflicting sources. In the absence of an arbiter, agents or groups of stakeholders possessing the majority of communication channels and strongholds, may have an easy game in getting their agenda through, by funding studies and organizing public relations campaigns that overwhelm the financial and coordination capacities of independent voices.[4] The next step is outright censorship.

Censorship and selective reporting

The sentence "The good news will not arrive from the social media. It will arrive from the authorities" is however revealing of something more drastic than sheer paternalism and points directly to censorship and selective reporting by the accredited information sources. The COVID-19 emergency has an abundance of examples to offer. Starting with the Italian Government that instituted a Task Force for the surveillance of fake news regarding COVID-19[5], with related guidelines (Presidenza del Consiglio dei Ministri, Unità di monitoraggio COVID-19, 2020), up to the cases of tech giants, such as Google, Facebook, Twitter, Youtube and the like, that are adopting bans for non-aligned content and redirecting information searches to governmental official sites. A particularly illicit behavior is Google application of their coronavirus misinformation policies to users' personal files. Google Drive has started to take down users' files in response to media complaints about them containing coronavirus misinformation. In an article reporting on the takedown (Parker, 2020), The Washington Post's Silicon Valley Correspondent Elizabeth Dwoskin justifies such activity on the basis of the fact that after the coronavirus documentary Pandemic was censored on social media, some YouTube clips were telling users how to access "banned footage" from the documentary via Google Drive. Dwoskin also writes that The Washington Post reported 12 videos to YouTube, 61 Face-

[2] "Le persone credono a ciò che desiderano. Tutti desideriamo che arrivi un farmaco che scacci questa malattia e tutti vorrebbero avere questa buona notizia. La buona notizia non arriverà dai social media. Arriverà dalle autorità".

[3] Notwithstanding the borders closure, Italy's brutal lockdown has been registered also far away from its territory: Durden Tyler (2020) Welcome to Orwellian Italy, ZeroHedge, 04/24/2020: https://www.zerohedge.com/political/welcome-orwellian-italy-2020 (last visited 28th May 2020).

[4] This also generates methodological problems, given that aggregation studies, such as meta-analyses are assumed to be sampling from an unbiased population of studies.

[5] https://informazioneeditoria.gov.it/it/notizie/unita-di-monitoraggio-per-il-contrasto-della-diffusione-di-fake-news-relative-al-covid-19-sul-web-e-sui-social-network-adottato-il-4-aprile-il-decreto-di-istituzione-presso-il-dipartimento/

book posts and Instagram links to Facebook, and 24 videos to TikTok for featuring the Plandemic trailer. In response, YouTube removed five of the videos, Facebook removed nine of the posts, and TikTok said it removed most of the videos[6].

Such increasingly overbearing practices by big tech companies manifestly aiming to control and filter content (here, specifically, about COVID-19 related issues), to the point of removing private files of the platform users, not only violate fundamental freedoms of thought and speech, but also infringe most basic privacy and information property rights. Most significantly, the definition of "misleading content" is obviously determined by the tech companies, with no clear details as to their rationale (see for instance: the Google Drive's policies)[7].

A step further in this escalation is a vaccine advocacy project, backed by a number of coalitions favoring vaccination, the National Foundation for Infectious Diseases, and funded by BIO, the world's largest biotechnology lobbying group, gathering hundreds of pharmaceutical and biotech companies. The project is unprecedented in that it aims to "conscript an army of keyboard warriors trained to block, hide, and report" vaccine 'misinformation' (Wired, 2020). The project manager, Joe Smyser, is CEO of the "Public Good Project", a public health nonprofit specialized in using social network analysis to implement large-scale behavioral change programs. The subtitle of the Wired article covering it is revealing: "Anti-vaccine messages on social media have tripled since the pandemic began. One public health group wants to teach pro-vaccine Americans to fight fire with fire". Instead of transparently engaging with the public and hiring experts to discuss the debated issues in the public arena, thousands of "everyday people who have some free time now and then to join the digital scrum" are enrolled in order to marginalize dissenting voices. The main goal of the project however is to go beyond persuasion and put pressure on politicians so as to induce universal mandatory vaccination by "closing vaccine-exemption loopholes in state policies". It seems indeed that no persuasion is as convincing as coercion, since research shows that rates of vaccination correlates most closely to States' vaccine requirement policies (Omer et al. 2018, Nyhan 2019).

Artificial inflation of scientific uncertainty

A step further on our scale regards the inflation of scientific uncertainty for persuasive purposes. With "artificial inflation" of scientific uncertainty we denote all cases of strategic interactions based on scientific evidence and knowledge, characterized by various sorts of asymmetries, where the decision makers (the Principal in game-theoretic terms) or their associates (counselors) impose their cherished option, via: 1) using double standards of evidence so as to make unfavorable options not enough supported by data for the decision at stake; 2) undermining the trustworthiness of sources of evidence which contrasts their interests; 3) undermining the reliability of non-aligned scientists (e.g. using ad hominem arguments and blame games).

Double standards

The adoption of double standards for the evaluation of evidence depending on its content and implications seem to regard diverse therapeutic options already available in the COVID-19 case[8]: e.g. the off-label use of the malaria drug hydroxychloroquine (henceforth HCQ) in earlier stages of disease onset (Wang et al., 2020; Cortegiani et al., 2020; Kapoor & Kapoor, 2020; Gao et al., 2020; Tang et al., 2020); the compassionate use of the historically established convalescent plasma transfusion (henceforth CPT) as rescue treatment (Duan et al., 2020; da Silva, 2020; Zhao et al., 2020; Ye et al., 2020; Zeng et al., 2020; Bloch et al., 2020; Suthar et al., 2020); the use of low molecular weight heparin (EBPM) in patients in severe conditions to avoid worsening (Tang et al., 2020; Mycroft-West et al., 2020); and the wide-spectrum anthelmintic drug, ivermectin, usually used against parasites (i.e. scabies, onchocerciasis, strongyloidiasis, lymphatic filariases; Caly et al., 2020; Wagstaff et al 2011). We will focus here on the first two.

Convalescent plasma therapy

Doctor De Donno, director of Pneumology at the Poma Hospital in Mantua, has started with his collaborators an experimentation with CPT on about one hundred critically ill patients and found the immediate improvement and the subsequent, almost immediate, recovery of coronavirus patients. Throughout there were no deaths among the people treated; only patients who have improved to recovery or stabilized. Nobody got worse. Furthermore, CPT responds flexibly to the fast changing virus (Italian strains are different from Chinese or U.S. ones), in that patients are transfused with local convalescents' plasma.

Scientists agree that although there is still no definitive data, this therapy, accompanied by other therapeutic treatments can help reduce mortality (Rajendran et al., 2020).

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[6] During her search for the elaboration of this article, one of the authors saw the removal the content for at least three addresses: One, a Time article on the expulsion of WHO officials by the late President Nkurunziza in Burundi: https://time.com/5836654/burundi-who-expulsion-election-coronavirus/; a second one, devoted to the pervasive bribery practices of the pharmaceutical industry with respect to physicians: http://www.italianosveglia.com/32000_medici_corrotti_da_case_farmaceutiche_il_nuovo_scandalo-b-107576.html?fbclid=IwAR0E8RB-OcU-9NbhbYKif6zOnj9-rtS_3vQ_lMABYTXVknWdjKtHLuGcQgw; and a third one, relating to material that had been stored on google drive: https://drive.google.com/file/d/1pi6X3dPKjtrpmiVEdGT4vyCCw573IabG/view

[7] https://support.google.com/docs/answer/148505?visit_id=637256004092724506-3619940695&hl=en&rd=1

[8] https://www.recoverytrial.net

Notwithstanding these promising results, and no available alternatives, the Italian Higher Institute of Health (Istituto Superiore di Sanità, ISS) has expressed so far cautionary advises on the topic (COVID Contents, 2020). ISS experts have stated that: "it is evident that polyclonal antibodies capable of neutralizing SARS-CoV-2 virus are developed in animal models as a result of natural or experimental infection. Preliminary evidence is being consolidated that plasma transfusion from convalescent subjects to SARS-CoV-2 patients can be therapeutically effective. The role of non-neutralizing antibodies, which in the case of SARS in some cases have "stimulated" *viral replication, should be further investigated. However, it is still difficult to identify the linear or conformational target portions of the S protein on which to base the production of monoclonal antibodies for therapeutic purposes on a large scale*" (COVID Contents, 2020). Hence against a long case series of successful outcome, ISS requests the acquisition of further evidence. This sort of objections seems to miss the point, since the pressing question during the emergency is not whether a given therapy can be developed on a large scale (which is of course desirable, but whose impossibility cannot be advanced as a point against its implementation), but to verify whether it works in the first place.

It is however worth of notice that The ISS together with the Italian Medicines Agency (AIFA) are carrying out a national multicenter randomized controlled study in order to evaluate the efficacy and the role of plasma obtained from recovered COVID-19 patients, with a standardized protocol including severely ill patients. The aim is to obtain "solid" scientific evidence on the role of injecting antibodies from recovered patients in blocking the viral infections in diseased patients (AIFA, 2020). It seems however difficult to ethically understand random allocation of the currently only available therapy, although insecure, to severely ill patients (La Caze et Osimani 2020). Possibly, the study is a mixture of prospective studies and randomized controlled trials. Anyway, this would not change the issue in a relevant manner, and the press release (AIFA, 2020) is too synthetic to understand the methodological details.

Hydroxichloroquine

The off-label use of HCQ followed analogous patterns. The treatment guidelines for COVID-19 issued by the NIH on 21 April recommended neither for nor against the use of HCQ. On 24 April, the Food and Drug Administration (FDA) issued a "drug safety communication" warning against the use of either hydroxychloroquine or chloroquine outside a hospital setting or clinical trial due to reports of "serious heart rhythm problems" (Carrie Wong, 2020). The updated guidelines do not give any recommendation, but only provide a critical report of the list of current studies on HCQ (NIH, 2020)[9]. Withdrawal from a negative judgment towards the drug might have been advised by the scandal related to deceitful publications on The Lancet and NEMJ, retracted for being grounded on fraudulent data (see related section on scientific fraud). But, astonishingly, as of 15th June 2020, FDA has retracted the Emergency Use Authorization for HCQ, mainly based on evidence on hospitalized patients, which is irrelevant for evaluating a preventive therapy such as HCQ. "Early outpatient illness is very different than later hospitalized florid disease and the treatments differ. Evidence about use of hydroxychloroquine alone, or of hydroxychloroquine+azithromycin in inpatients, is *irrelevant* concerning efficacy of the pair in early high-risk outpatient disease" (Risch, 2020, our emphasis). Being cognizant about this, the FDA notification does not explicitly mention any of the studies made on inpatients, but only vaguely refers, neither mentioning the authors nor the publisher, to an RCT performed on healthy subjects, particularly exposed to the risk of contracting the virus. This is indeed the right target population for a preventive drug. However the study delivers a non-significant result due to ad hoc data analysis (see section on scientific fraud). One also discovers that the main author is a scientist working for Gilead, the company producing remdesivir (which is patented until 2037), a direct competitor of HCQ (no longer patented).

Furthermore, neither the NIH guidelines, nor the retraction notification mention an epidemiological survey by Risch (2020), whose outcome is instead very positive for HCQ: "Five studies, including two controlled clinical trials, have demonstrated significant major outpatient treatment efficacy. Hydroxychloroquine+azithromycin has been used as standard-of-care in more than 300,000 older adults with multicomorbidities, with estimated proportion diagnosed with cardiac arrhythmias attributable to the medications 47/100,000 users, of which estimated mortality is < 20%, 9/100,000 users, compared to the 10,000 Americans now dying each week". The author concludes: "These medications need to be widely available and promoted immediately for physicians to prescribe"[10].

The FDA decision to retract the EUA stays in stark contrast against *obvious considerations*, such as the unavailability of any alternative therapy for outpatients – Remdesivir has shown mild effectiveness in hospitalized inpatients, but no trials have been registered in outpatients – and the life-saving potential of the drug, considering the lethal course of the disease. The press release emphasize with understandable

[9] https://files.covid19treatmentguidelines.nih.gov/guidelines/covid19treatmentguidelines.pdf, pp. 61-68.

[10] Risch (2020) also notes: "An outpatient treatment that prevents hospitalization is desperately needed. Two candidate medications have been widely discussed: remdesivir, and hydroxychloroquine +azithromycin. Hydroxychloroquine+azithromycin has been widely misrepresented in both clinical reports and public media, and outpatient trials results are not expected until September".

emphasis: "We remain committed to using every tool at our disposal in collaboration with innovators and researchers to provide sick patients timely access to appropriate new therapies". Excusatio non petita, accusatio manifesta[11].

The basics of cost-benefit analysis would demand that when a lethal disease has yet not found any cure, then any emerging therapy, even supported by little evidence of efficacy (and safety), may be worth a try in order to possibly save lives. In our case, in the face of the virus-induced thromboembolism, both HCQ, heparin, as well as plasma treatment are always better than leaving the patients to their destiny. In the face of sure death, anything goes and it is perfectly rational. This kind of reasoning has been institutionalized in the so-called compassionate use (rescue treatment), but it seems not to cross the mind of many scientists, such as Remsidivir fan Anthony Fauci, Roberto Burioni, and the FDA officers, who keep on downplaying CPT or HCQ, while invoking the development of vaccines. It is indeed irrational to allow cherry-pick evidential standards in order to disqualify some treatments, when nothing else is still available. This is substantially an abuse of evidence standards. Such abuse is also made possible because evidence standards are being often dogmatically adhered to, without a full understanding of their rationale and their true import (Osimani, 2020; Osimani et al., 2018; Landes et al., 2018; Osimani and Mignini, 2015).

The apex of such abuse has been reached in a NY hospital in which, according to the recorded witnesses of an emergency nurse, economical incentives to intubate patients (the Hospital would receive $29,000 and additional supplies from the State), any alternative treatment with respect to the hospital protocol, has been downplayed to the point of getting people worse and dye. A banned video[12] records dialogues related to a case in which a 37 years old man entered the hospital with respiratory distress, resulted negative to COVID tests and nevertheless was put into ventilation and died; compassionate use of alternative therapies proposed by nurses is persistently denied by the doctors (47'30" until the end).

Conspiracy theories

Another way to discredit non-aligned theories is to label them as "conspirationist". For instance, regarding the previously mentioned google's ban of the film "Pandemic", the Washington Post's Silicon Valley Correspondent Elizabeth Dwoskin frames users sharing files containing the Plandemic trailer with each other as: "people motivated to spread misinformation about the virus – efforts that continue to thwart social media companies' attempts at preventing hoaxes and conspiracy theories from spreading amid the greatest public health crisis in decades".

Virus origin

Because of its implications regarding the matters we are discussing, the origin of the virus has been heatedly discussed and the conspirationist label has been generally attached to those attributing its origin to lab experiments:

"Currently, there are speculations, rumors and *conspiracy theories* that SARS-CoV-2 is of laboratory origin. Some people have alleged that the human SARS-CoV-2 was leaked directly from a laboratory in Wuhan where a bat CoV (RaTG13) was recently reported, which shared ≈96% homology with the SARS-CoV-2" (Liu et al., 2020).

However, being RaTG13 (the Rhinolophus Affinis bat coronavirus living in a cave in Yunnan) considered putatively responsible for SARS-CoV 2002 by some, and having Sars-Cov-2 a 96% genomic similarity with it, may genuinely suggest that Sars-Cov-2 is the product of laboratory experiments on 2002 SARS-Cov.

Another hypothesis related to the laboratory origin of the virus emerged already in unsuspicious times in a 2015 article appeared on Nature (Menachery et al., 2015)[13], reporting about the experiment of a group of researchers, who had grafted the surface protein of SHC014 virus, taken from horseshoe bats in China, on the SARS virus taken from mice, thus creating a chimeric "supervirus" capable of affecting humans directly, without passing through an intermediate species. More specifically, the virus is able to affect human airway cells, and its surface protein structure is perfectly able to bind to a human receptor on the cells and to infect them. Such a characteristic seems to connect this chimera to the 2020 coronavirus[14].

However, in Andersen, et al. (2020) it is stated that the high-affinity binding of the SARS-CoV-2 spike protein to human ACE is most likely the result of natural selection on a human or human-like ACE2, and that this is strong evidence that SARS-CoV-2 is not the product of purposeful manipu-

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[11] Luckily, HCQ is FDA approved for other conditions such as malaria and the autoimmune disease Lupus erythematous; hence it can be prescribed off-label by the individual physician. This however only underlines even more, if necessary, the irrationality of the FDA decision. How can HCQ have a favorable risk-benefit profile for malaria and Lupus, and a negative one for a much more rapidly precipitating disease such as COVID-19?

[12] https://banned.video/watch?id=5ee13c3cc7a607002f0c8187

[13] An interesting reportage on this story also appeared in a TV dossier dating back to 16th November 2015, hosted by RAI 3 (Italian national channel), edited by Maurizio Menicucci.

[14] Another piece of the story is that bat coronaviruses have been studied at the Wuhan Institute since 2013 (Butler, 2015). Further support to the "covid-19 engineering theory", is the fact that Xing-Yi Ge (Key Laboratory of Special Pathogens and Biosafety, Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, China), one of the authors of the 2015 Nature article, had announced, already two years before, the isolation from bats of coronaviruses capable to bind to the key human receptor SHC014 (Ge, Xing-Yi, et al., 2013). This means that the engineered coronavirus mentioned in the 2015 study was not the first one having such capacity (Butler, 2015). http://www.istitutoovidio.edu.it/attachments/article/702/Coronavirus_Book.pdf

lation: "the genetic data *irrefutably* show that SARS-CoV-2 is not derived from any previously used virus backbone". Furthermore, the Spike of the RaTG13 virus of the bat is very different from that of the SARS-CoV-2, and apparently not able to hook ACE2 (Andersen, et al., 2020; Zhang, et al., 2020), hence, according to Andersen and colleagues, this casts doubt on its engineered origin.

In a March 2020 notification, the editors of Nature felt the need to express concern about the use of the aforementioned studies as a basis for theories on covid-19 engineering, pointing out both the lack of evidence to validate them and that scientists believe that an animal is the most likely source of the coronavirus (Butler, 2020). Yet, a series of experts such as Prof. Richard Ebright, molecular biologist (Board of Governors Professor of Chemistry and Chemical Biology at Rutgers University and Laboratory Director at the Waksman Institute of Microbiology, USA) and Prof Nicolai Petrovsky, contest the natural origin of the virus[15]. According to Prof Nicolai Petrovsky, endocrinologist and immunologist (Australian Academy of Science, Adelaide), the SARS-CoV-2 highly infectiveness in humans, due to the spike protein ability to preferentially bind human ACE receptor with the highest binding affinity than any other known species, is definitely a "suspicious" element[16] (Piplani et al., 2020).

Another element of suspicion regards the fact that the genomic sequence of RaTG13, allegedly discovered in 2013 by Zheng-Li Shi, has been published only in January 2020[17].

Is manipulation of viruses detectable?

Another controversy regards whether virus engineering or manipulation may or may not be detectable. The received view is that since manipulations imply the insertion of long strands of DNA, engineering a virus leaves an evident mark, so it's easily detectable. According to Massimo Galli, infectious disease expert and head of the Sacco hospital in Milan, and to Simon Wain-Hobson (Head of Molecular Retrovirology at the Pasteur Institute, Paris) an expert eye could immediately recognize something made in the lab[18].

By contrast, other experts such as Prof Michael Antoniou (Lecturer in Molecular Genetics at King's College University, London), there are several ways to manipulate a viral genome without leaving any human trace. According to Antoniou, if refined changes are made on some pairs of the genetic sequence of a bat coronavirus (i.e. the amino acid sequences of the Spike viral protein), then it is impossible to distinguish whether it is a mutation from natural selection or an intentional laboratory manipulation. This sort of fine-tuned manipulations are possible thanks to the large amount of knowledge available on the viral proteins nature, so "you can precisely decide where going to manipulate. And if you do it, you don't leave a signature behind you"[19].

Pathogenic properties of the virus

Another controversy related to the debate over the origin of the virus is represented by SARS-Cov-2 pluripathogenic properties (i.e. its ability to attack many organs at the same time). David Walt, Harvard Hughes Medical Institute Professor, called this phenomenon highly unlikely to be found in nature, and Antoniou added that a scientist in the laboratory through mutagenesis saturation and selection methods can select these properties "and it would be much easier than waiting for them to happen naturally"[20]. More specifically, one can choose specifically which organ or cell to infect (e.g. lung cells, neurons, liver, muscles, etc.) until one finds "a variant of the virus that can infect many types of these cells"[21]. Also, Robert Garry, virologist at Tulane University in New Orleans in Louisiana, didn't find an explanation regarding the particular cleavage site that gives SARS-CoV-2 "a 100-1,000 times greater chance than SARS-CoV of getting deep into the lungs"[22]. (Cyranoski, 2020) In a 2020 study the authors argue that "the virus's ability to infect and actively reproduce in the upper respiratory tract was something of a surprise, given that its close genetic relative, SARS-CoV, lacks that ability (Wölfel et al., 2020).

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[15] According to some, in order to incontrovertibly validate the natural origin of the virus one would not only need to obtain related viral sequences from animal sources, but also get to know how the spillover from animal to human exactly happened. These are all but trivial tasks. Some evidence in this direction is available but still fragmentary and therefore highly inconclusive. For instance, studies identified the pangolin as the probable intermediate in the bat-man transmission of the virus. (Lam et al., 2020) (Andersen et al., 2020) (Li et al., 2020) (Zhang and Holmes, 2020). https://www.fisv.org/info-covid-19/435-origine-ed-evoluzione-di-sars-cov-2.html

[16] "SARS-CoV-2 is a highly adapted human pathogen" and "the data indicates that SARS-CoV-2 is uniquely adapted to infect humans" (Piplani, Singh, Winkler, Petrovsky, 2020).

[17] Zheng-Li Shi is an expert in bat coronavirus at the Wuhan Institute of Virology and working in the biosecurity-level laboratory 4 (the highest one and the same used for smallpox and Ebola virus) and is also co-author of the RaTG13 2020 aforementioned work. It is really anomalous for a researcher to wait seven years before revealing such important discovery, and it is even more suspect that she decided to do so only when the covid-19 pandemic exploded in Wuhan, as also Antoniou points out. https://www.youtube.com/watch?v=F51jxe4B1uU

[18] https://wargametechnology.weebly.com/blog-standard

[19] Indirect evidence of engineering activities regarding viruses comes also from the existence of so called "gain of function" research; a research program which seems to serve warfare purposes, since its results are "dubious and dangerous": Simon Wain-Hobson (Head of Molecular Retrovirology at the Pasteur Institute, Paris): https://www.youtube.com/watch?v=F51jxe4B1uU

[20] The pioneer of the revolutionary use in the genetic and proteomic sequencing process of microwell arrays for single-molecule detection and analysis https://wyss.harvard.edu/team/core-faculty/david-walt

[21] https://www.youtube.com/watch?v=F51jxe4B1uU

[22] He said: "when I saw SARS-CoV-2 had that cleavage site, I did not sleep very well that night". (Cyranoski, 2020)

Virus spread

Equally controversial and shady are the information about the origin of the virus *spread*. In a study conducted by the South China University (Xiao and Xiao, 2020), the biologists Botao Xiao and Lei Xiao support the theory of the virus escape from a Wuhan laboratory, located near the city market, from which the epidemic seems to be arisen by direct transmission of the pathogen from bats to humans. However, as evidenced by witnesses, the bat would not be a food sold in the city and in particular in that market. Botao Xiao and Lei Xiao, argue that "the possible origins of the 2019-nCoV coronavirus could have as a cause the infected animals kept in the laboratory by the Wuhan Disease Control Center (Whcdc), including 605 bats"[23].

But what is more puzzling is the fact that, as a retrospective analysis reported, the virus emerged at the end of 2019 in France, (Spiteri et al., 2020) and since october 2019 in Italy, as reported by Dr. Manera, anesthesiologist at the Pope John XXIII Hospital in Bergamo[24]. With these findings, the story of the Wuhan animal markets seems to falter and break down. Another French study, conducted by doctors at Jean-Verdier Hospital in Bondy, Paris, found that a 42-year-old hospitalized on 27 December 2019 was ill with COVID-19. Moreover, the patient had not been in China in the previous months. (Deslandes et al., 2020).

The debate over the origin of the virus, its pathogenic properties and spread does not only have theoretical import, but has critical implications in geopolitical terms, since an engineered virus can be used not only for medical research purposes, but also as a bioweapon. In the latter eventuality, no one can exclude that it is spread in target areas for strategic reasons. Although this may seem a gloomy sci-fi scenario to some, history is there to remind us that science has been put to the service of constructing nuclear weapons and vivisect human people during WWII for instance, hence hastily dismissing the question over the virus origin, make-up and properties is culpably naïf, all the more since the controversy is all but settled. Establishing that the virus is natural or not, may also have considerable consequences as to the reliability of estimations regarding a "second wave" and their underpinnings.

Blame game

As a next step to undermining unfavorable evidence, comes the personal attacks to non-aligned scientists.

The internationally renowned virologist, Giulio Tarro, chief emeritus of the Cotugno Hospital in Naples[25], was object of this Blame Game. Tarro assumed an attitude of indictment towards high political and governmental offices, especially towards the Prime Minister Giuseppe Conte by pointing out that it's "an idiocy" to wait for a vaccine which could never arrive (as for AIDS)[26]. Roberto Burioni criticized Tarro on this, by affirming the need and importance of a vaccine, while acknowledging the long time it takes to be found. The two scientists were the protagonists of a twitter spat in which Burioni stated: "If Tarro is a Nobel virologist, I am Miss Italy"[27]. Burioni was then threatened with a lawsuit by Tarro, who defined him as "an allologist"[28].

The Journalist Massimiliano Coccia attacked Tarro for inconsistencies that emerged in his CV, by reporting as false his statements on his person and professional experience[29].

Other protagonists of this story, such Alberto Zangrillo and De Donno received similar hostile treatments. Few days after announcing the successful outcomes of his CPT therapy at Mantua Hospital, Dr. De Donno received an inspection from the Hygiene Inspector Police (Nucleo Antisofisticazione e Salute). Dr. Alberto Zangrillo, received media cover on past controversies with the justice, soon after stating that the virus is clinically dead, based on evidence that Intensive Care Units at his hospital had not been receiving COVID-19 patients for weeks[30].

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[23] https://wargametechnology.weebly.com/blog-standard

[24] https://www.oltre.tv/dottor-manera-anestesista-bergamo-racconta-storia/

[25] *L'allievo di Sabin*, in *La Repubblica*, 13 aprile 2003 (consultato il 31 maggio 2020).

[26] Claudio Franceschini, *Giulio Tarro "Galera per i pro-vax"| Video, "Conte vuole il vaccino? È un'idiozia"*, su *ilsussidiario.net*, 22 aprile 2020 (consultato il 31 maggio 2020).

[27] https://www.corriere.it/padiglione-italia-grasso/20_maggio_24/tarro-burioni-ballata-virologi-tuttologi-8e860d70-9cdf-11ea-a31e-977f755d9d62.shtml

[28] https://www.quotidianonapoli.it/2020/05/25/tarro-il-virus-sta-seguendo-il-ciclo-epidemico-ecco-abbandoneremo-il-distanziamento-sociale/

[29] Massimiliano Coccia, *Chi è davvero Giulio Tarro, il virologo anti-Burioni e De Luca. Tra titoli inventati e bufale*, su *l'Espresso*, 24 aprile 2020 (consultato il 31 maggio 2020). The virologist was also attacked by colleagues for his opinions about COVID-19, more specifically for making a statement as based on a "spurious correlation" in claiming that: "36% of coronavirus is activated precisely by flu vaccinations", a percentage that seems to have been taken from what the Councilor of the Lombardia Region, Giulio Gallera, said previously, that is: "36% of cases affected the over-75s" in his region, a segment of the population that most likely had made the flu vaccine (see: Juanne Pili, *Coronavirus. Le tre strane dichiarazioni di Giulio Tarro sul COVID-19 e le vaccinazioni antinfluenzali*, su *Open*, 23 aprile 2020; and Claudio Franceschini, *Giulio Tarro "Galera per i pro-vax"| Video, "Conte vuole il vaccino? E' un'idiozia"*, su *ilsussidiario.net*, 22 aprile 2020. URL consultato il 31 maggio 2020). However, Tarro's theory is indirectly supported by the January 2020 US Pentagon study (Wolff, 2020), which reports that "the odds of coronavirus in vaccinated individuals were significantly higher when compared to unvaccinated individuals with an odd of 1.36. The vaccinated were 36% more likely to get coronavirus." (see also: https://childrenshealthdefense.org/news/vaccine-misinformation-flu-shots-equal-health/).

[30] http://www.atlanticoquotidiano.it/quotidiano/gli-attacchi-a-zangrillo-svelano-lipocrisia-anche-gli-scienziati-se-non-sono-dei-

Scientific propaganda

This is the other side of the censorship coin. Whereas scientists non-aligned with the narrative cherished by the pharmaceutical industry and other lobbying stakeholders are marginalized, silenced and blame-gamed, those who work for such groups are interviewed ubiquitously in the mainstream media, pontificating about possible second waves and hypothetical, indispensible, vaccines.

The Medical Association AMPAS issued a Public Notice on the topic, and other related issues (AMPAS, 2020). The Notice denounces the climate of propaganda of the accredited media broadcasting 24/7 COVID-19 information, by repeatedly inviting the very same experts (known to be affiliated and generously paid by interested parties), without any adversarial voice.

The AMPAS president, Dr. Luca Speciani laments a violent information strategy and climate of opinion crime[31]. Following a series of considerations the Notice asks for the immediate establishment of a balanced participation of all scientific voices and opinions in TV shows and the like (a sort of scientific "par condicio"), with the obligation for any scientific expert appearing in the media to declare their conflicts of interest, the prohibition of content removal from internet platforms, unless for severe violations of the law, and the prohibition to disbar doctors from Medical Associations, only based on their opinions. The fact that these requests need to be advanced is a clear sign of the point to which freedom of speech and opinion has been repressed during the COVID-19 emergency.

Scientific fraud

One of the most striking news in the middle of the COVID-19 "Infodemia" was Lancet retraction (Lancet, 2020) on June 4th 2020 of the study: "Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis" (Mehra et al., 2020a), published just few days before on May 22, 2020.

The retraction came after a heated debate on the efficacy and safety of HCQ, used by Dr. Didier Raoult (Director of the Clinical Microbiology Laboratory for the University Hospitals at Marseilles) and colleagues in order to treat early stage COVID-19 patients at their hospital, resulting in a death rate of 0.009% out of 4000 otherwise successfully treated patient. The Lancet study, ascertaining lack of efficacy and suggesting safety issues for HCQ, was in fact based on tainted data. These were claimed to come from a large dataset, which later revealed to be non-existent, owned by Surgisphere, a company founded by one of the study authors, Sapan Desai[32].

The Lancet study was a rush job, holds Paul Craig Robert (Institute of Political Economy), since "it was essential for Big Pharma to prevent the spread of the HCQ treatment, and awareness of its safety and effectiveness. The study's authors completed the data collection around the middle of April and the study was published on May 22. It was used to close down the WHO's clinical trial of hydroxychloroquine in coronavirus patients citing safety concerns. *Most likely, the trial was aborted in order to prevent an official agency from finding out that HCQ worked* […]. The intent is to bury HCQ as a low cost effective treatment and to put in its place a high cost alternative whether effective or not, and to supplement this enhancement of profits with mass vaccination which might do us more harm than the virus itself"[33].

Noticeably, The Lancet was not the only journal falling in the trap, since also another high league journal, the New England Journal of Medicine, *published a peer-reviewed study based on* "the same" Surgisphere data submitted by the same authors (Mehra et al., 2020b). This study, supposed to include "data" from COVID-19 patients from apparently 169 hospitals in 11 countries in Asia, Europe and North America, was retracted by NEJM on the same days.

Less in the spotlight, but a real telltale sign of how the scientific publication system has been captured by industry interests, is the case of yet another study published by NEJM. This is a study by Boulware and colleagues (Boulware et al., 2020), claiming no significant association between HCQ and COVID-19 recovery endpoints. Under the scrutiny of "Collectiv Citoyen France Soir" (Le Collectiv Citoyen France Soir, 2020), such lack of association is revealed to be the result of ad hoc subgroup analyses (so called "HARKing": Kerr, 1998). When taking the entire sample, the association magically reemerges[34]. The mystery of such

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loro-vanno-zittiti-e-delegittimati/

[31] "They never called on us, because there is a plot and they must keep on maintaining panic until vaccines arrive. But people must know why always the same people talk [in the accredited media], and that these people received vast amounts of money from pharmaceutical companies. A simple declaration of conflicts of interest would do, as it is done at congresses and in scientific publications. It would help people understand that not everybody is speaking in the name of Science, even if they say so": https://www.oltre.tv/dottor-speciani-mantenere-panico-arrivo-vaccino/.

[32] Only few days after being issued, Guardian Australia revealed conspicuous errors in the Australian data included in the study: "The study said researchers gained access to data through Surgisphere from five hospitals, recording 600 Australian Covid-19 patients and 73 Australian deaths as of 21 April. But data from Johns Hopkins University shows only 67 deaths from Covid-19 had been recorded in Australia by 21 April. The number did not rise to 73 until 23 April". Five hospitals in Melbourne and two in Sydney, essential for obtaining the Australian patient numbers claimed to be available in Surgisphere database, denied any role in such a database, and said they had never heard of Surgisphere.

[33] https://www.paulcraigroberts.org/2020/05/28/the-campaign-against-hcq-part-ii/.

[34] "Si on fait l'analyse comme les auteurs l'on fait, sur 1 jour à 4 jours indépendamment on trouve des différences non significatives. Cela veut dire que l'écart de mesure entre les deux chiffres ne peut pas

a "counterintuitive" choice of analysis is solved when one searches for authors' affiliations and finds out that Boulware actively collaborates with Gilead, the producer of remdesivir, HCQ direct competitor[35].

The sample of other contemporary studies analyzing the therapeutic effects of HCQ with respect to COVID-19 also show inefficacy or possible cardiac issues with HCQ. Among these we find e.g. a retrospective study in France, a US study on veterans, and an aborted Brazilian trial (see NIH 2020). Here the observation of negative results may be effortlessly be explained by the illogic (or strategic?) inclusion criteria. Patients mainly belong to late stages of the disease (or to multimorbidity groups), which is a non-sense given that HCQ is thought of as a prophylactic with exclusive preventive virtues, hence plainly powerless against damages caused by the virus.

The boldness of such moves is even more evident if one considers that HCQ has a long history of safe use for malaria, and that evidence for its efficacy as a prophylactic measure against COVD-19 can no longer be considered anecdotal (Nina and Dash 2020). Indeed Raoult and colleagues had already published a paper in 2007 reviewing the safety profile of the drug for repurposing it against infections from SARS-COV with positive results, and the US National Institutes of Health published *studies in its journal* "Virology" touting chloroquine as "a potent inhibitor of SARS coronavirus infection" *as far back as 2005* (Vincent et al., 2005)[36].

However, as Andrew Gelman (Gelman, 2016) noticed regarding a similar retraction in 2016 (for the controversial PACE study), reputation is a two-way street: "The Lancet editor is using his journal's reputation to defend the controversial study. But, as the study becomes more and more disparaged, the sharing of reputation goes the other way". Indeed as never before, the COVID-19 emergency is showing to the world how naively oversimplified is the view of science as a microcosm of diligent pursuers of truth (García, 2019; Bucci, 2015; McGarity and Wagner, 2008).

Authoritarianism

The above mentioned AMPAS press release (AMPAS 2020) expresses concern about the exercise of certain fundamental rights of citizens. In particular, it emphasizes the lesion of constitutional rights such as freedom of movement, the right to study, the possibility of work, and the possibility of access to care for all non-coronavirus patients; and serological tests for all. In addition, several possible consequences of Italian political choices are analyzed from a medical perspective: the impediment of sporting activity affects both the constitutional rights and the psychophysical health of citizens. Isolation is likely to have not only particularly psychological distressful implications, but also serious economic consequences, which will have an impact on public health in turn.

In Italy the Government apparently delegated all his emergency strategy to a series of task forces, whose first step was to ask for legal immunity regarding their recommendations. In the end, the task forces acted as a screen for the government to enact unwelcome and illegitimate policies, such as a draconian lockdown measures, and their enforcement *manu militari*, without taking direct responsibility for them.

Suppression of scientific investigation: "scientific lockdown"

The Italian Government issued a ministerial newsletter on 8th of April (Ministero della Salute, 2020), where it was suggested to avoid autopsies, while criteria in case a facility would decide to actually practice an autopsy. The consequence of these indications was a drastic reduction in the number of autopsies. It is utmost suspicious that in the face of total ignorance about the pathophysiology of the COVID disease, the responsible authorities have discouraged such an important means of investigation as autopsies (Aguiar et al., 2020; Pomara et al., 2020; Salerno et al., 2020). "Autopsy remains the gold standard to determine why and how death happens. Defining the pathophysiology of death is not only limited to forensic considerations; it may also provide useful clinical and epidemiologic insights. Selective approaches to postmortem diagnosis, such as limited postmortem sampling over full autopsy, can also be useful in the control of disease outbreaks and provide valuable knowledge for managing appropriate control measures" (Pomara et al., 2020). It is also no alibi that autopsies have been discouraged to safeguard the health of health professionals for two reasons: 1) the virus becomes innocuous once the host is dead; 2) forensic doctors performing autopsies wear special protective suits, included masks and gloves all the time. It is also no excuse that the emergency hit without notice and did not allow us

être considéré comme pouvant entraîner une conclusion comme quoi le traitement fonctionne mieux que le placebo. Les bases statistiques apparaissent fiables même si les échantillons sont un peu petits et donc cela rend les tests statistiques plus délicats. Mais avec la science statistique allons plus loin. Quand on regroupe les échantillons en personne étant exposées 1 à 2 jours ou 1 à 3 jours donc avec des échantillons plus grands et donc plus fiables, là les tests deviennent significatifs. Ainsi la conclusion de l'étude Boulware est erronée. Ce qui plaiderait en faveur de l'hydroychloroquine et changerait les conclusions de cette etude".

[35] Paradoxically (?), in their editorial introduction to Bouleware's and colleagues' paper, NEMJ state: "So, what are we to do with the results of this trial? The advocacy and widespread use of hydroxychloroquine seem to reflect a reasonable fear of SARS-CoV-2 infection. However, it would appear that to some extent the media and social forces – rather than medical evidence – are driving clinical decisions and the global Covid-19 research agenda". (Cohen, 2020, p. 2).

[36] Yet "coronavirus czar Anthony Fauci throws shade at the drug whenever he gets a chance" (Buyniski, 2020).

to be prepared, since the recommendation to avoid autopsies was reaffirmed on a later newsletter on 2nd May.

Indeed, it is exactly thanks to some "dissident" doctors, such as Giampaolo Palma and Stefano Manera, that the lethal outcome of the virus was finally correctly diagnosed: death from COVID-19 was not due to pneumonia but to thromboembolism. If made in due time, this diagnosis would have saved most lives hit by the epidemics. Indeed ventilators, which were used in order to counteract respiratory distress have caused more harm than good in such conditions.

Delay/obstruction/ suppression of clinical practices

The application of double standards to non-lucrative therapies such as HCQ and CPT is obviously delaying their implementation. This grossly violates the Doctor's prescription authority: that is the Doctors' freedom to choose the best therapy for their patients, based on the individual risk-benefit profile and the citizen's health freedom (Osimani, 2007, 2010, 2013). Such interference has sometimes become an outright suppression of such freedom, for instance with Governor's Andrew Cuomo outright ban of HCQ in the State of New York.

Another chapter of this story has been the delay and renitence in authorizing access to serological tests. Such tests are not expensive and identify distinct types of antibodies as a function of (IgM), or (so called "memory antibodies" IgG). This information, together with other clinical and epidemiological data may help distinguish immunized vs. non immunized people with a certain accuracy. Hence, they allow more rational containment measures, by permitting that those that have already been infected but are now healed, may go back to work and perform their usual activities without endangering oneself or the other. This approach would have saved much psychological distress, not to mention the enormous difference it would have had on economics and society.

In the same Public Notice mentioned above, the AMPAS wonders why the Italian Government, and Health Institutions more generally, have been so hostile towards serological tests to the point of banning them until reliable tests are approved. This is totally irrational in a situation of emergency, where even a coarse discrimination between infected, non-infected and recovered would be enormously helpful.

Exploitation of death tolls to silence opposition

The pandemic tragedy has not hindered profiteering of death tolls for silencing governmental oppositions, or vice versa to retaliate and attack specific governments. In Italy, as soon as the judiciary started criminal investigations on the Regions most hit by the COVID-19, which are ruled by opposition parties, the parliamentary opposition against the Government comprehensibly slowed down.

One member of the Majority Party (Partito Democratico, PD) had the idea to counterfactually estimate the number of casualties, were the opposition at the government: according to his exact computations, cemeteries would have not been enough. Probably averse to bookkeeping, another member of the same party put it more metaphorically, speaking of an anticultural legacy that cost "thousands of deaths"[37].

This kind of considerations is echoed in the Italian and international arena, where leaders non aligning with the medicalization agenda are being blamed for mismanaging the COVID-19 emergency. These are criticized for downplaying the risk and "science denialism" (Haltiwanger, 2020; Pitzianti, 2020). A curious allegation, since these leaders are the same that first asked to contain the epidemics by closing borders; a proposal that WHO rejected for being discriminatory against the Chinese people. Furthermore, these accusations keep on hiding the fact that although e.g. UK, US; Russia, Brazil and India rank among the highest for *number of cases*, the same does not hold for deaths or serious and critical patients. Hence this means that they might not be good at stopping the virus from being spread around, but at least they seem able to prevent it to harm.

Malevolent social planning

The convergence of a series of mistakes such as the unavailability of face-masks when they were most needed, and their later imposition in the open air, where they are harmful; the hesitancy to close national borders when they would have dammed the virus penetration from the most infected areas, and the drastic containment measures inflicted two weeks later on citizens, by prohibiting anyone to move from one municipality to the other (unless for basic certified needs); the untimeliness of lockdown measures and their punitive style, all jointly contributed to the rising suspicion that all these measures were part of a plot designed by a "malevolent" social planner, i.e. politicians driven by personal interests, to the expense of those of the community, whose welfare, safety and security, they are supposed to strive for. Undeniably, the policymaker has been perceived as someone abusing their position, in order to curb resistance, and bend the population will against several unpopular policies in sight.

The suspicion of malevolence is somewhat reinforced by the fact that pre-existing information, which seemed to predict the COVID-19 outbreak, has been long in the hand of the scientific community and of interested authorities (see: Cheng et al., 2007; Antonelli et al., 2017). After Ebola and Sars, epidemiologists and scientists around the world have repeatedly warned governments of the likely arrival of a new virus. Among them, Vincent Racaniello, a Higgins professor in the Department of Microbiology and Immunology at Columbia University's College of Physicians and Surgeons, and

[37] https://www.adnkronos.com/fatti/politica/2020/05/28/coronavirus-alema-populismo-costato-migliaia-morti_ujhlqUd8Hi0AhHiJ5Y0xNJ.html

Maria Van Kerkhove (WHO technical guide on COVID-19). The question then naturally arises whether the COVID-19 outbreak was somehow already foreseen (or predictable) and therefore whether prevention measures could have been taken in due anticipation by the relevant Authorities at national and supranational level, so as to avoid (economically dreadful) lockdown measures and reduce the number of deaths. Such forecasts were believable and available, so their neglect is perplexing and casts doubt on the bona fide of those responsible for taking action on their basis.

Furthermore, some of the lockdown measures have been not only very harsh, but also seem utterly counterproductive: the prohibition to practice sport activities in the open air, or to have a solitary bath in the sea, to walk in the wood or in the public gardens, and the related physical and psychological distress, are all measures that weaken the immune system and therefore make people more susceptible to the virus, rather than contain the epidemics. Also absolutely incomprehensible from a medical point of view is the recommendation not to seek for professional health assistance at the appearance of suspicious signs of the infection, and instead to await while treating early symptoms with antipyretics: fever is universally known to be a powerful natural antiviral mechanism, therefore suppressing it is the opposite of what one would do in the case of a viral infection. Moreover, self-care becomes rapidly useless with COVID-19, since the clinical picture of this disease may quickly deteriorate in particularly susceptible subjects.

This is all the more striking since Governments have based these and other recommendations and policies on the suggestions of specialized agencies (such as the World Health Organization), and task forces of experts. Among these, the recommendation provided by WHO to refer COVID-19 patients into nursing homes, that is into communities comprising the most fragile and virus-susceptible people. The hecatomb of deaths in Lombardy is mainly due to this nefarious protocol. This is paradoxical also in view of the harsh isolation measures imposed on the entire population of healthy and less susceptible people.

At this point, it would be thus culpably naïf to think that these agencies are neutral transmitters of scientific knowledge, untouched by personal interests (whether financial or in terms of career advancement and prestige), or by the mandate of lobbyist groups.

One informative sign that they are not exactly there to help people solve their problems, is the fact that they have been asking, and obtained, to be exempted from any legal liability regarding the consequences of the interventions that would result from their counseling. This happened for the 15 Task Forces comprising more than 400 experts established by the Italian Government, and also for the legal indemnity on vaccines granted by FDA to pharmaceutical industry and also to Bill Gates (Public Readiness and Emergency Preparedness Act: PREPP; PHE 2020; see also Sullivan, 2018 for a Court precedent)[38].

Supranational agencies, such as WHO, are also not impervious to extrinsic agendas, since their funding is overwhelmingly of private origin (mainly pharmaceutical companies). Furthermore, geopolitical games may interfere with the Agency's inherent mission even through public funding only, since the political weight of each country in determining the Ageny's policy may well be proportionate to the generosity of its contribution[39].

The suspicion that the several "mistakes" made by WHO and various governments with astonishing coordination are means to an end of a cleverly engineered plot may well be tagged as a conspiracy theory. But all the cues emerged so far, and the convergence of synergic motives by several agencies at play, make for a smoking gun.

Further confirmations in this respect are mounting up at a remarkable rate: Bill Gates, a private billionaire with no degree in Medicine, was received by many Heads of State and concluded multimillionaire agreements for vaccines commissions, even before they are developed, and with dim prospects about how and if they will ever come out. Given the highly

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[38] Children'S Health Defense sets a connection between Gates' request of legal immunity and scientists' attempts to develop a virus for the first Sars-Cov: "Scientists first attempted to develop coronavirus vaccines after China's 2002 SARS-CoV outbreak. Teams of US & foreign scientists vaccinated animals with the four most promising vaccines. At first, the experiment seemed successful as all the animals developed a robust antibody response to coronavirus. However, when the scientists exposed the vaccinated animals to the wild virus, the results were horrifying. Vaccinated animals suffered hyper-immune responses including inflammation throughout their bodies, especially in their lungs. Researchers had seen this same "enhanced immune response" during human testing of the failed RSV vaccine tests in the 1960s. Two children died. […] Fauci has made the reckless choice to fast track vaccines, partially funded by Gates, without critical animal studies before moving into human clinical trials that could provide early warning of runaway immune response. Gates (in the video) is so worried about the danger of adverse events that he says vaccines shouldn't be distributed until governments agree to indemnity against lawsuits". Indeed, indemnity has been obtained through Federal regulations giving coronavirus vaccine producers full immunity from liability.

[39] A fragment from Sharav's dossier on Children's Health defence mentions the "(a) the collusion of public health officials to deceive the public by concealing scientific evidence that confirms empirical evidence of serious harm linked to vaccines – in particular polyvalent vaccines; (b) the "willful blindness" by the medical community as it uncritically fell in line with a government dictated vaccination policy driven by corporate business interests. Public health officials and the medical profession have abrogated their professional, public, and human responsibility, by failing to honestly examine the iatrogenic harm caused by expansive, indiscriminate, and increasingly aggressive vaccination policies. On a human level, the documented evidence shows a callous disregard for the plight of thousands of children who suffer irreversible harm, as if they were unavoidable "collateral damage" (Sharav, 2020).

contentious issue, the signature of such agreements should at least have been preceded by a parliamentary discussion, when not a public one. Failing to arrange a transparent discussion and to involve society further jeopardizes the already crumbly trust in the scientific enterprise, and especially in the information provided by interested knowledge producers. Science policy becomes politicization of science (Tallacchini, 2019). Whereas the former sets up a dynamic and transparent interaction between science and democracy, based on the authoritativeness of the producers of scientific knowledge, and the authority conferred on people's representatives by established democratic processes and institutions, the latter adopts an authoritarian stand and abuses science, by using it directly as a power needing no justification, qua science.

Information wars

The strategic importance of contemporary science as a weapon in geopolitical terms is evidenced by heinous episodes and diplomatic incidents that occurred during the COVID-19 emergency. Apart from the notorious dispute between the President of the United States Donald Trump and the World Health Organization, as well as China, regarding the timely disclosure of material evidence for controlling the spread of the epidemics, and the timeliness of suggested countenance measures with respect to their outcomes (Trump, 2020), other affairs in this chapter are worth of note.

DOE, NIH and DODE investigation on Ivy League Universities

The most prominent, although gone on the sly in the mainstream media is the U.S. Department of Education (DOE) decision to open an investigation on Yale and Harvard universities for failing to disclose contracts, gifts and donations from foreign donors, such as China, Saudi Arabia, Qatar, Russia, United Arab States, Huawei Technologies and ZTE. The latter two were included on a U.S. sanctions blacklist the previous year on grounds of being national security threats (FCC, 2019). A Senate report as of February 2019, describes the influence of China on the U.S. academic system as "effectively a blackhole" (U.S. Senate, 2019), and a letter from DOE general counsel Reed D. Rubinstein to Sen. Rob Portman, the chairman of the committee that authored the Senate report, China's Communist Party "invests strategically" in the U.S. education system and such investments come with constraints that can interfere with academic freedom (U.S. DOE, 2019). The letter also reports investigations from the U.S. DOE and congressional findings revealing that the six investigated universities failed to disclose $1.3 billion excess from foreign sources; one U.S. university "received research funding from a Chinese multinational conglomerate to develop new algorithms and advance biometric security techniques for crowd surveillance capabilities"; more generally, most donations and funding were linked to dissemination of propaganda, "soft power" information activities, or stealing sensitive and proprietary research and development data, as well as other intellectual property. These findings were agreed in many respects with analogous UK reports on similar matters (UK Parliament FA, 2019) and other UK Institutes reports (Parton, 2019; UK Conservative Party Human Rights Commission, 2019).

Following such investigations, both Yale and Harvard are accused of soliciting funds from foreign governments, companies and individuals who are hostile to the US and looking to steal classified research (O'Keefe, 2020). The investigation is being fostered by a bipartisan group in Congress and conducted by a coalition of federal law enforcement, the National Institutes of Health, and the Departments of Defense and Energy (O'Keefe, 2020).

This Notice of investigation came after the arrest of Charles Lieber, former Chair of Harvard University's Chemistry and Chemical Biology Department, who was also involved in China's strategic research programs, such as the Thousand Talents Program" mentioned in the DOE notice of investigation[40]. The Thousand Talents Program was started in 2008 to invite excelling Chinese scientists working abroad back to China, and then became, according to the above mentioned legal documents, a recruitment plan seeking to entice foreign and Chinese minds working in overseas institutions to bring their knowledge and experience to China, often rewarding them for stealing proprietary information (U.S. DOE, 2019).

The NIH initially became aware of ethical breaches regarding classified research or intellectual property rights, because identical grants were submitted to several agencies, and most strikingly, confidential grant applications from other researchers were shared with collaborators in China. Beyond the case of Lieber that reached visibility in the media, up to 180 other scientists were investigated or "debarred", and letters sent to 60 institutions (Mervis, 2019). The most prominent case is NIH resolution to defund a longstanding research project, "Understanding the Risk of Bat Coronavirus Emergence", led by EcoHealth Alliance, Inc, a non-profit research agency based in NY and Shi Zhengli[41], a virologist based at the Wuhan Institute of Virology (WIV). Beyond the production of several scientific publications, the project also led to the disclosure of several genetic sequences of bat coronaviruses, which have been used in the development of

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[40] Beginning 2011 Lieber became a "strategic scientist" at Wuhan University of Technology (WUT). The notice of DOE to the President of Harvard University is available here: https://www2.ed.gov/policy/highered/leg/harvard-20200211.pdf?utm_content=&utm_medium=email&utm_name=&utm_source=govdelivery&utm_term=

[41] The resolution took place on 24th April 2020 and the termination letter is available here: https://nlcampaigns.org/NIH_termination_letter_to_Daszak_4_24_20.pdf

Remdesivir (a potential pharmaceutical treatment for COVID-19)[42].

Pierre Nkurunziza's unexpected death

A most miserable case of "information war" is also represented by the sudden death of the President of Burundi, Pierre Nkurunziza on 8th June 2020. The sad news has been given with some skepticism regarding the apparent cause of his death e.g. by the BBC News: "Burundi President Pierre Nkurunziza dies of 'cardiac arrest' at 55"[43]. Indeed, Nkurunziza had expelled six WHO officials from his country just few days before, with a directive dated 12th May, which should be executed on May 15th. The Health Minister motivated this decision on grounds of unacceptable interference by the WHO in the management of the emergency[44]. The unexpected death of Nkurunziza casts a gloomy shadow on the entire affair, which is indeed emphasized by the disappearance of the news concerning his expulsion of WHO's official from the Time website[45].

Science tyranny: the therapeutic state

In view of the irrationality of some lockdown and containment measures, the propaganda machine put into place, and the censorship of any non-aligned voice, the COVID-19 emergency may reasonably perceived as a troy horse for the enactment of agendas cherished by some industry lobbies, and an excuse for top-down shaping a new society, without a genuine democratic involvement.

This is especially the case for contentious topics such as mandatory vaccination and "Immunity Passports". With the imposition of vaccination, through "nudging" (such as conditioning civil freedoms to immunity), or obligation, we come to the heart of the problem.

Mandatory vaccination

Vaccination is an extremely problematic health technology[46]. First of all, the debate is polarized and confused by coalescing seasonal vaccines with other kinds of vaccines, e.g. those developed to fight measles or polio; whose risk-benefit profile are fundamentally different, in that they prevent irreversible and severely disabling diseases. Such confusion extends to the concept of herd immunity. Whereas herd immunity has been instrumental for the permanent eradication of infectious diseases such as smallpox, typhoid or chickenpox, etc., it makes very little sense to use it as a lever to introduce mandatory vaccination for seasonal flu, which cannot be eradicated, since it comes again every year with different viral strains.

However, seasonal vaccines have become the attractors of huge financial interests, exactly because if herd immunity is set to be the target, then it is also implied that vaccines should be administered to as large as possible sectors of the population. In turn, this means a much bigger market than therapeutics, whose market share is determined by their indication.

However, seasonal vaccines are known to be a sort of bet on the target virus, since they are developed by estimating its profile on the basis of its precursors; viral interference is also an issue, since it is not uncommon that subjects vaccinated against a specific strain develop a, possibly lethal, hyperimmune reaction when exposed to another viral strain. Finally, vaccines, as any other health technology, have inevitable collateral effects. But since they are administered to healthy people, safety requirements should be much stricter than for therapeutic treatments aimed to cure sick people.

Against this background as well as the constitutional rights of health freedom and doctor's prescription authority (not to mention the Oviedo Convention: Council of Europe, 1997), the increasing interference of the legislator on therapeutic choices, such as the decision to vaccinate oneself against seasonal flu, represents a worrying approach to the relationship between science and the law, which contradicts the intrinsic mission of both institutions (Tallacchini, 2018; 2019; Jasanof, 2009; Iannuzzi, 2018; Blume, 2017, Gainotti et al., 2008).

EU "Vaccination Roadmap"

An exemplar case in this respect is represented by the EU "Vaccination Roadmap"[47], a tightly scheduled program star-

[42] In a warning email to EcoHealth that preceded the defunding resolution, written by the NIH Deputy Director for Extramural Research, Michael Lauer, it is stated: "The scientific community believes that the coronavirus causing COVID-19 jumped from bats to humans likely in Wuhan where the COVID-19 pandemic began. There are now allegations that the current crisis was precipitated by the release from Wuhan Institute of Virology of the coronavirus responsible for COVID-19. Given these concerns, we are pursuing suspension of Wuhan Institute of Virology from participation in federal programs": https://www.sciencemag.org/sites/default/files/Lauer.Daszak.NIH%20grant%20killed.partial%20email%20transcripts.April%202020.pdf

[43] The reader familiar with journalism's rhetoric will have noted that 'cardiac arrest' is in quotation marks. https://www.bbc.com/news/world-africa-52984119

[44] https://www.theguardian.com/world/2020/may/14/burundi-expels-who-coronavirus-team-as-election-approaches

[45] https://time.com/5836654/burundi-who-expulsion-election-coronavirus/

[46] The recent expulsion from the Cochrane collaboration of Peter Gøtzsche in relation to his strong dissent (Jørgensen et al., 2018), regarding a meta-analysis on HPV (human papilloma virus) vaccines, published by the Cochrane itself, casts shadow not only on the reliability of the evidence provided by even the most respected institutions, but is also a red flag of the strong pressures these institutions are subjected to (see also Boem et al., 2020).

[47] https://off-guardian.org/2020/05/22/report-eu-planning-vaccination-passport-since-2018

ted in 2018, whose mission is to introduce a "common vaccination card/passport" for all EU citizens by 2022.

The Vaccination Roadmap is a policy plan to spread vaccine "awareness and understanding" whilst counteracting "vaccine myths" and combatting "vaccine hesitancy". Its implementation includes a feasibility study that goes from 2019 through 2021. (European Commission, 2019). Some of the highlights raise several ethical, legal, and political concerns: 1) Examine the feasibility of developing a common vaccination card/passport for EU citizens; 2) "Develop EU guidance for establishing comprehensive electronic immunization information systems for effective monitoring of immunization programs." 3) "overcome the legal and technical barriers impeding the interoperability of national immunization information systems". Knightly (2020) reports that during the joint EU-WHO "Global Vaccination Summit" on September 2019, a "10 Actions Towards Vaccination for All" plan was announced (European Commission and WHO, 2019), and a simulated pandemic exercise focusing on a zoonotic novel coronavirus originating in bats, Event 201[48], was organized with the sponsoring of Johns Hopkins Center for Health Security, the World Economic Forum, and the Bill & Melinda Gates Foundation in October 2019. "The point is that proposed COVID countermeasures, which have been presented to the public as emergency measures thought up on the fly by panicking institutions, have in fact existed since *before the emergence the disease*. They already wanted to monitor your vaccination records and tie that to your passport, introduce mandatory vaccinations and clampdown on "misinformation". They just didn't have a reason yet. This was a situation which required a crisis and, fortuitously, it got one. The exact ratio of contrivance to happenstance will never be known" (Knightly, 2020).

Even more disquieting than all this premeditation is the fact that, notwithstanding this project constitutes a violation of health freedom, and privacy rights, as well as other constitutionally protected rights, it has never been politically scrutinized, nor publically discussed.

European peoples are kept in the dark about such coordinated actions by their legislators in cahoots with agencies and companies holding vested interests of financial and other nature. Instead of involving them in a transparent and open debate on these programs, they survey the citizens' opinions on the matter (European Commission, 2018), then design communication campaigns to increase compliance and establish a sort of thought police for dissidents (including involuntary psychiatric hold, e.g. TSO in Italy, or 5150 in the US); finally, law enforcement follows. As a Nature editorial rightly points out, mandatory health treatments are forms of juridical systems devoid of a solid democratic tradition: "mostly post-Soviet Union states" (Nature, 2018). We would suggest, that the EU gaslighting policies in this sense are even more unfortunate, in that they put up a brainwashing system, with the aim to induce the majority of the population to align with the envisaged policies and to even act as a whistleblower against incompliant citizens.

ID 2020

Evidence about the opacity of all this processes is signaled by the recent resignation of one of the six members of ID2020's technical advisory committee (Powers, 2020). The ID2020 Is a public-private alliance, whose partners include Microsoft, Accenture and Hyperledger. According to the website, its goal is to develop a global model for the design, funding and implementation of digital solutions and technologies. Resignation of the adviser, Elizabeth Renieris, followed the publication of a white paper, which should have been published as Executive Director Dakota Gruener's exclusive personal view, and was instead published as an ID2020 paper. Renieris had raised concerns about security and legal issues related to blockchain based digital credentials linked to COVID immunity passes, but instead of receiving any response on the merit of her queries, the related section was dropped altogether. The paper was nevertheless published as voicing the official opinion of the entire committee.

Renieris, founder and CEO of HACKYLAWYER, fellow at the Berkman Klein Center for Internet & Society at Harvard University, and a Technology & Human Rights fellow at the Carr Center for Human Rights Policy at Harvard's Kennedy School of Government, explained her concerns in her resignation letter (see Powers, 2020) and in a white paper co-authored with privacy and public health experts (Renieris et al., 2020): "Despite limited backing from civil society or public health experts, as well as warnings from historians and bioethicists, technologists are racing ahead to build and deploy digital certificates that would allegedly let individuals "prove" whether they have recovered from the novel coronavirus disease (COVID-19), have tested positive for antibodies, or have received a vaccination, should one become available".

Renieris and coauthors insist that such artifacts could interfere with our right to privacy, freedoms of association, assembly, and movement, our rights to work and education; and otherwise seriously limit our freedom and autonomy,

[48] https://www.centerforhealthsecurity.org/event201/about. One month after this event "a call to action" for "Public-private Cooperation for pandemic preparedness and response" was published: (The Johns Hopkins Center for Health Security, World Economic Forum, and Bill & Melinda Gates Foundation, 2019). "Coincidentally, on December 2019, first covid-19 cases were reported from China. What we DO know, at this point, is that SARS-Cov-2 is nothing like the threat originally reported, they admit as much themselves. We also know they keep churning out the fear anyway. And, thanks to documents like this, maybe now we're starting to see why" (Knightly, 2020).

even where not compulsory[49]. After reaffirming that the interference of digital certificates with such fundamental human rights may be justified only in extraordinary circumstances and may in no case contravene the established law, the authors go on analyzing whether the "immunity passport" for COVID-19 is anything feasible, legal, and ethically legitimate. The passport does not pass any of these tests. From a medical perspective, given the scarce knowledge about specificity and sensitivity of antibody tests, positive results are all but a sure fire for discriminating immune from non immune subjects, furthermore nothing is known about whether immunization against SARS-Cov-2 (either through exposure to the virus or vaccination) is permanent or only transitory, or whether exposure to the virus confers immunity at all.

Not only do antibody tests give little guarantee of truly identifying immune people; also the development of a vaccine for SARS-Cov-2 is all but straightforward. Hence, the legitimate question by Renieris et al. (2020): "How could partners and stakeholders coalesce around a viable immunity certification process, whether paper-based, digital, or otherwise, amid such uncertainty, a lack of evidence, and paucity of tools like reliable diagnostic and antibody tests, or safe and effective vaccines on which to anchor immunity status?" It also makes no sense from their perspective to refer back to the yellow fever international certification of vaccination, whose primary function is to "prevent the spread of this disease into non-endemic settings. By contrast, COVID-19 is a viral respiratory illness *already classified as a pandemic*. Immunity passports will, in no way, put this particularly terrible genie back into the bottle". The entire project of an "Immunity passport" is also fraught with technical problems that branch out into privacy issues, and ethical as well as legal infringements; such as the creation of perverse incentives, risks of exclusion and stigmatization, facilitation of potential collusion, passive surveillance, and re-identification through data inference. They conclude: "The prospect of severely curtailing the fundamental rights and freedoms of individuals through ill-thought-out plans for "immunity passports" or similar certificates, particularly ones that would leverage premature standards and a highly experimental and potentially rights-infringing technology like blockchain, is beyond dystopian". Indeed the development of a global public registry in connection with immunity classifications has no other explanation then the goal to enforce vaccination (Weise, 2020).

This scenario is a threat to both the scientific enterprise and the survival of democratic societies, since it definitely breaches the confidence pact between science and society, as well as between citizens and political institutions. Is there a way out of this picture?

Discussion: a new Hippocratic Oath

In a recent manifesto (Saltelli et al., 2020), a group of epistemologists and scientists warned against the perils of "politicians presenting their policies as dictated by science", and political rivals brandishing mathematical models in order to support predetermined agendas and disguise political decisions as technical ones. The manifesto pleas for the acknowledgment of ignorance following Nicholas of Cusa's emphasis on the "docta ignorantia": "Spurious precision adds to a sense of false certainty. […] Opacity about uncertainty damages trust […] We are calling not for an end to quantification, nor for apolitical models, but for full and frank disclosure". In particular, it is important to emphasize asymmetries in acknowledging such scientific uncertainties and managing them.

Although scientific dissent is commonplace, especially when dealing with radical uncertainty (Dupuy, 1994; Kay and King, 2020), the COVID-19 emergency let come to the sunlight how uncertainty may be downplayed or stressed depending on specific agendas.

However, suspicions about the possible conflicts of interest affecting the scientific enterprise, and the system of incentives characterizing the ecosystem in which scientific activities and practices are embedded lead in turn to a loss of trust in, and in the policy maker.

In particular, the COVID-19 gloomy scenario reveals to be the effect of a deadly mix of malicious incentives. The IT companies interest in further increasing the implementation of digital technologies in every area of our life, the pharmaceutical industry's interest in mass vaccination, and related regulatory capture, the legislator concern over the increasing welfare expenditures, hospitals incentives to intubate people rather than curing them in the earlier phases of the disease, etc.

Several doctors, scientists and politicians are raising their voices against this setup: the AMPAS public notice mentioned above, an open letter sent to the Premier Minister and other Health Authorities by a group of concerned doctors (Bacco et al., 2020), the testimonies of nurses and the interviews to scientists cited in this paper, the activism of several public figures, among whom most prominently Robert Kennedy Jr. and his Foundation "Children's Health Defense", all testify that there is increasing awareness over the bleak prospect of a technocratic society. This gives hope that energies can be joint in order to counteract such destructive forces.

Science is increasingly perceived as a "credence good" (Akerlof, 1978, Osimani et al., forthcoming). Consequen-

[49] "For example, while not expressly mandated by law, individuals in post-lockdown China must be able to produce a "green" QR code of health status on their mobile device in order to access public transportation, enter workplaces or residences, and more, and have virtually no way of challenging the automated determination of status" (Renieris et al., 2020).

tly, opinions do not only diverge among scientists, but also regarding science policy approaches, e.g. regarding the best institutional and market-based mechanisms to be used to design the bio-pharma ecosystem, comprising universities and research centers, knowledge-intensive corporate sectors, public and private health-care providers, NGOs, associations and citizens.

This paper cannot tackle these questions systematically, but we advance some proposals. First, doctors should decide whose side to stay, and take action. As also the AMPAS letter emphasizes, prevention should be given a much more prominent role in Medicine and patients should be defended from medicalization. Doctors should be a stronger barrier between the industry greed and the people's health and wellbeing. A preventive approach would have obvious beneficial repercussions also on the State expenditures for the health care system.

The responsible authorities should consequently develop virtuous mechanisms that reward overall public and individual health, instead of just reimbursing interventions (with the consequent spiral of increasing insurance costs).

Experts should be involved in a transparent and non-delegating manner. Experts should bring their contribution in the democratically elected Parliament, who should then decide on the basis of such contribution and in considerations of non-scientific issues, such as ethical, economic, religious and legal desiderata. Otherwise experts just become an excuse to sidestep democratic procedures.

As Tallacchini (2019) underlines, authoritarianism and nudging are not the only possible routes to be explored. A third way is a new confidence pact between institutions, private sector and citizens, and a new Hippocratic oath between patients and doctors, fostered by the right mechanisms, both for the social planner and for the entrepreneur, in view of the long term wellbeing and welfare of the population. If someone needs to be nudged, this is those who hold the power in the system of asymmetries characterizing complex societies, not the vulnerable, whom the State should defend from abuses of power, of any kind.

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