Innocent, Guilty or Reluctant Midwife?
On the Reciprocal Relevance of STS and Post-truth

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Abstract: The rise of post-truth has called into question STS, mostly in the defendant's role. A critique from outside, such as Lee McIntyre's, provides a debatable account of science deconstruction and its appropriation by "right-wing postmodernism". Within STS, post-truth has revamped discussions on the implications of the symmetry principle, or elicited a reiteration of arguments for more inclusive generation of public facts. Steve Fuller stands out as a dissonant, more intriguing voice. He praises post-truth for triggering and expressing an emancipatory thrust against elites and an institutional rearrangement of science, and blames STS for being too shy with its midwifing role. However, he also underestimates the import of ongoing changes. The struggle over truth has shifted to an ontological level, raising doubts on optimistic views. If STS is relevant to post-truth, the vice versa also applies. Post-truth indicates that STS has to equip itself for a socio-technical world ever-more distant from the one in which it has developed.

Keywords: post-truth; co-production; proaction; responsible innovation; precipitatory governance.

Submitted: July 18, 2018 – **Accepted:** May 20, 2019

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1. Introduction

The rise of post-truth has thrown STS into the centre of the storm, generally in the defendant's role. In this paper, I outline some ways in which the relationship between post-truth and STS has been accounted for, outside and within STS, highlighting related limits (or what appear to me to be so). The larger space is devoted to Steve Fuller, as the dissonant voice in the choir: he praises rather than blames post-truth, and blames STS for opposite reasons to those advanced by others, namely for being too shy with its midwifing function. His claims about the present and

prospective social role of science are worthy of consideration, though it seems to me he also fails to take full stock of what is going on. In any case, as I argue, the post-truth debate offers STS an opportunity for reflecting on how to proceed in a socio-technical world ever-more distant from the one in which it has developed.

2. Post-truth and the Science Deconstruction Controversy

With the election of Donald Trump and the *Oxford English Dictionary*'s proclamation as the word of the year for 2016, post-truth has come to the forefront engendering heated debates, mostly building on the pejorative sense of the definition of the *Dictionary* ("relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief"). As for STS, post-truth has revitalized discussions concerning the legitimacy and implications of social inquiry into the production of scientific knowledge.

The sociology of scientific knowledge (SSK) had questioned (or, better, regarded as irrelevant to its purposes) the epistemic exceptionalism of science, raising for this very reason the problem of its own epistemic status. With the development of lab studies and related methodological perspectives such debate had seemingly settled. Yet, in fact, the topic never went out of sight; it rather changed in focus: from a discussion over the epistemic status of science studies to a debate over the effects of deconstructive approaches on science as an institution and the ensuing social and political consequences. Taking initially the character of an external attack (the "science wars" of the 1990s) and subsequently of a self-critique (Latour 2004), criticisms built to a significant extent on the claim that, more than supporting weaker social groups by exposing the hidden links between scientific authority, economic interests and political powers, science deconstruction may undermine the very possibility of contesting such interests and powers in the name of indisputable factual evidence.

The rise of post-truth has corresponded to a refuelling of these controversies. This time STS is under attack simultaneously from outside and from within. Debates over post-truth address a number of topics, including the impact of traditional and new media on public opinion and the state of health of contemporary democracies. Yet, in most accounts, post-truth seems to consist primarily in an undermining of the role long given to science in public affairs: from the privileged relationship, or elective affinities, between science and democracy theorized by Dewey and Popper to the crucial function assigned to scientific expertise in the policy process, thanks to its ability to "speak truth to power" (Wildavsky 1979). And if science delegitimation is at the centre of the post-truth debate, STS could hardly avoid being called into question.

3. Post-truth and the Critique of STS from Outside

As for attacks coming from outside STS, a good example is offered by the philosopher of science Lee McIntyre. He defines post-truth as an "eclipse of truth", in the sense of its growing irrelevance in shaping public opinion and decision-making: a "careless indifference toward what is true"; the replacement of factual evidence with "truthiness" (i.e. truth-feeling); its subordination to political points of view up to denying basic facts, hence challenging "the existence of reality itself" (McIntyre 2018, 9-10). Why is this happening? For McIntyre the main reason is "science denial": the delegitimation of the authority of science occurred in the last decades and the consequent growing possibility of casting doubts over factual evidence, from the health effects of smoke to climate change. And such delegitimation is an offspring of science studies, especially the "strong programme" of SSK, with its claim that "all theories – whether true or false – should be thought of as the product of ideology" (2018, 129). In its turn, SSK is an offspring of post-modernism, with its claim that everything can be treated as a text, open to interpretation, and that knowledge and power are to be regarded as interwoven, constitutive of each other. Postmodernists regarded their move as "emancipatory" from cultural and social hierarchies. What they did not foresee, says McIntyre, was the rise of a "right-wing postmodernism", that is reactionary forces who learned from post-modernists how to undermine unwelcome scientific evidence. Post-truth is an effective application of this lesson.

I find McIntyre's account problematic in various respects. First, he defines post-truth as both *disregard* for truth and *disbelief* in truth, which to me are different standpoints: one is compatible with straightforward realism; the other corresponds to anti-realism, either methodological (one cannot describe things "as they are") or metaphysical (what we define as real depends totally on our minds or conceptual schemata). Moreover, disregard for truth and disbelief in truth are equated to *perspectivism*, which in my view is yet another standpoint: one whereby, so to say, the shape truth takes is affected by the (historical, social, gendered…) point of access to truth. Second, possibly as a result of this conflation of meanings, McIntyre misconstrues both postmodernism and SSK. Neither of the two rules out the possibility of truth claims. Taking for example Foucault (one of the champions of postmodernism, according to McIntyre), his idea of critique (Foucault 2007) is based on a deflated account of truth claims, seen as building on socially and historically positioned perspectives, which however does not mean they consist in mere "assertions of authority" (McIntyre 2018, 126). Nor does the "strong programme" correspond to McIntyre's account. Symmetry is not an epistemic but a methodological claim, concerning how to approach science as a social field where the "truth, success or rationality of a given 'belief' [are irrelevant] in order to set up a social explanation of how it became ascendant

and why adherents continue to hold to it" (Lynch 2017, 595). Third, "right-wing postmodernism" does not necessarily deny or devaluate science; on the contrary, as the tobacco affair and climate change denial show, it may emphasise its relevance by stressing the lack of conclusive evidence in contrarian claims. Again, the problem with McIntyre's account seems that different phenomena are gathered under the umbrella-term of post-truth. One thing is making a case for alternative *interpretations* of facts, as with climate change denial; another is making a case for alternative (relevant) *facts*, as with the controversy over the health impacts of electromagnetic fields (can non-ionizing radiations have relevant effects? Of what sort? And how can we detect such effects?); yet another is making a case for alternatives *to* facts, as with Trump's political style. The alleged novelty and dramatic implications of the latter should however be gauged not so much against a fact-based "good old politics" – which has never properly existed, as politics has always been committed to going "beyond facts" (by prioritizing values against all odds, or by creating new facts through action) – but against the growing emphasis placed on "evidence" over the years, as a not-so-subtle ruse to depoliticize decision-making.

4. Post-truth and STS's Internal Debate

In sum, I do not find compelling or particularly well argued a critique of STS such as McIntyre's. What about, then, debates internal to STS? No doubt, the rise of post-truth has created some fuss. One can roughly distinguish three main positions.

First, we have those who, aligning with the Latourian self-critique, basically concur with McIntyre, blaming STS for having, if not exactly caused, at least eased the rise of post-truth. For Collins, Evans and Weiner, for example, "the logic of symmetry, and the democratising of science it spawned, invites exactly the scepticism about experts and other elites that now dominates political debate in the US and elsewhere"; hence "we have to admit that for much of the time the views STS was espousing were consistent with post-truth irrespective of their authors' intentions or their causal impact" (Collins et al. 2017, 581).

Others, such as Sismondo (2017a; 2017b) and Lynch (2017), reject such accusation, out of various considerations: that STS has never supported an "anything goes" approach, showing instead the hard work whereby scientific facts take shape; that the very definition of post-truth – as disconnect between facts and values, opinions, beliefs and emotions and the predominance of the latter, or as plain bullshit, casual dishonesty or demagoguery – has hardly anything to do with the type of work carried out in STS, beginning with how STS questions the obviousness of the very distinction between facts and beliefs or emotions; and that if anything, through its own work, STS helps to account for why "the emer-

gence of a post-truth era might be more possible than most people would imagine" (Sismondo 2017a, 3).

A third position is represented by scholars who are less interested in discussing the putative influence of STS on post-truth than in applying STS insights into the intermingling of truth production with power struggles, in order to analyse post-truth on these terms. Jasanoff and Simmet, for example, see in the emergence of post-truth the expression of "moral panics about the status of knowledge in the public sphere" (2017, 755), in itself not a novelty but in its present configuration the result of fundamental flaws in how truth has been used in policy-making: namely, failure in recognising that "debates about public facts have always also been debates about social meanings" (2017, 752). As STS outlooks on the "co-production" of knowledge and social order have documented, judgements of truth are always premised on judgements of worthiness. Then, against those who believe that "the only imaginable corrective [to post-truth] is to get more science and truth back into the public's uneducated, misled or distracted minds" (2017, 760), Jasanoff and Simmet's recipe sounds pretty much a reiteration of well-known arguments for a "deliberative democratization" of science: namely, to expand accountability for and inclusion in the selection of relevant concerns and generation of related public facts, with "precaution" working as a regulative criterion in between full scientization and full politicization of choices.

I find all three these takes on post-truth somewhat disappointing. On one side, holding STS as responsible (or otherwise) for the rise of post-truth is a question that cannot be resolved by discussing the "right" meaning of the symmetry principle or other features of STS approaches. To properly connect STS and post-truth one would need to delve into how, when, by operation of whom and to what extent STS outlooks have become integral to policy-making and political strategies; that is, to do something similar to the work carried out to account for how neoliberal ideas have spread in the academy and educational systems, the public administration and corporate management (see e.g. O'Malley 2004; Mirowski and Plehwe 2009; Lave et al. 2010). On the other hand, readings such as Jasanoff and Simmet's, perhaps because focused on the peculiarities of a particular political system (the US's), fail to notice that their reply to post-truth (more public deliberation, grounded on the precautionary principle) may and has indeed already become, in the hands of skilled political strategists and communicators, part of the problem. In this sense "right-wing postmodernism" is trickier to tackle than Jasanoff and Simmet seem to assume. Claiming that "endorsing the 'precautionary principle' can be seen as a first-order attempt to distinguish between worthy and unworthy objectives through politics, when facts are not available to resolve a dispute to everyone's satisfaction" (Jasanoff and Simmet 2017, 760) means neglecting that climate change denial, as the "war on terror" in Iraq, builds precisely on an application of precaution[1].

5. STS as Reluctant Midwife: Post-truth in Steve Fuller's Brave New World

Against this backdrop, Steve Fuller's contribution to the debate over post-truth – first with short interventions (Fuller 2016; 2017), then with a full-length book (Fuller 2018) – stands out as far more intriguing, deserving for this reason a closer scrutiny. The originality of Fuller's position lies in the fact that he both considers STS as largely responsible for the emergence of post-truth *and* celebrates the latter as a valuable achievement of society.

As the subtitle of his book states ("Knowledge as a power game"), Fuller takes sides with Jasanoff and Simmet on the basic assumption that knowledge cannot be separated from power, or science from politics, and on the role of STS in investigating this. A role, Fuller however stresses, which is more potential than actual, since "STS talks the talk without ever quite walking the walk" (Fuller 2018, 59). STS recoils from post-truth tropes – with special reference to the contingent, manufactured, negotiated status of consensus over interpretations, or what counts as relevant expertise – which it actually "routinized in its own practice, and set loose on the general public"; and it does so "whenever such politically undesirable elements as climate change deniers or creationists appropriate them effectively for their own purposes" (Fuller 2018, 59). For Fuller, STS fails to see how such very appropriation confirms the validity of the tropes, and confounds a political battle with a methodological one. STS, in other words, is a sort of reluctant midwife of post-truth. And if Jasanoff and Simmet consider post-truth as a novel variant of recursive moral panics about public knowledge, Fuller similarly regards it as "a deep feature of at least Western intellectual life" (Fuller 2018, 6). Yet, contrary to the former, he sees its rise to public relevance as a positive signal. Post truth is not an indication of the diseased condition of contemporary society, which reactionary forces turn to their own advantage, but rather of society's good health and dynamism. If elites can keep their position primarily by controlling the rules of the game, then post-truth shows that individuals and groups outside elite circles have "gone meta" (Fuller 2018, 3). They are increasingly able to question established rules, refusing to play accordingly and challenging the status quo that the elites try to preserve. In other words, people outside elites are increasingly able to exert "modal power", that is, "control over what people take to be possible" (Fuller 2018, 28).

To make his point Fuller borrows from Pareto the metaphor of "lions" and "foxes". "Both species are post-truth merchants. The lions treat the status quo's understanding of the past as a reliable basis for moving into the future, whereas the foxes regard the status quo as possessing a corrupt understanding of the past that inhibits movement into a still better future" (Fuller 2018, 2). Lions try to undermine the foxes' claims as

cognitively flawed and emotionally biased, thus failing on both epistemic and moral grounds. Foxes make their way in the cracks opened by flagrant disconfirmations of the lions' claims, which the latter's call for additional research is unable to fix. In this sense, foxes play a crucial role in social progress, exploring counter-inductive evidence and promoting counter-factual imagination.

The case for post-truth, Fuller notes, has already been made by Thomas Kuhn, with his account of truth as dependent on the framework of meaning by which evidence is elicited and assessed, and his portrayal of the "Orwellian" procedure whereby a new paradigm, once established, rewrites the past to make it match the current account of things. That post-truth is receiving so much attention, then, indicates that science – the most important field of play in the struggle over the definition of the actual and the possible – is increasingly consistent with its inherent democratic spirit, in both an epistemic and a social sense (Fuller 2018, 108-109). "The post-truth condition is here to stay, […] mark[ing] a triumph of democracy over elitism" (Fuller 2018, 181). Post-truth fulfils the democratic "right to be wrong" (2018, 151), showing people's growing willingness "to take personal responsibility [for decisions] whatever the consequences" (Fuller 2018, 13).

Fuller opens his discussion by addressing not a scientific but a political controversy, namely Brexit. He accounts for how foxes beat lions at their own game, taking advantage from the latter's own admission that there are problems with Europe and the institutional opening offered by the Parliament's right to call a referendum. Foxes proved to be both "more effective [and] perhaps more democratic and fairer to the people concerned" (Fuller 2018, 15) than their opponents. They replaced the latter's reliance on putatively objective yet actually flawed polling and survey work with profiling techniques based on correlation of a variety of data to reveal preferences, targeting communication to those segments of population whose orientation might switch to the desired direction. This, for Fuller, is no more – indeed arguably less – manipulative than coercing people to express their preferences. It is also in accord with Popper's vision of the open society as a living laboratory.

Uproar has recently been sparked in Italy by an immunologist, Roberto Burioni, who entered the controversy over the extension (to ten) of compulsory simultaneous child vaccinations claiming that "science is not democratic", in the sense that expert and laypeople opinion cannot be put on an equal footing. Fuller's book, then, ideally replies to Burioni, showing that post-truth concerns precisely the role of expertise, as "the most potent non-violent form of power available" (Fuller 2018, 161). Indeed, drawing on plenty of STS research, one can say that the breeding ground of post-truth is not mistrust in *science* but in science and science-based *policies*; not in *scientists* but in officially sanctioned *experts*. The latter are not engaged in a self-contained quest for knowledge, searching for answers to questions they pose to themselves, but in addressing issues

of public relevance, on which no one can claim to possess a comprehensive expertise. As Fuller (2018, 185) notes, in so doing experts tend to apply "scientific consensus" or "normal science" to defend the status quo from which their own rank depends[2].

Fuller (correctly, in my view) remarks that post-truth cannot be equated to anti-science. It rather indicates the acknowledgment that science plays a crucial role in one's life, hence cannot be left entirely in the hands of others. The risk is that in this way chaos prevails over order (Fuller 2018, 181), since "if the field of play in science is opened to all comers, then the rules of the game itself might change to become unrecognizable" (Fuller 2018, 6). Such risk, however, is for Fuller worth running, and indeed can be faced by applying quality control criteria to the production of truth in a reframed institutional arrangement, whereby science leaves its (alleged) ivory tower from which to dispense pearls of wisdom to the laity, to enter the marketplace, while university withdraws from its growing commitment to research to focus on teaching, that is on fulfilling its crucial historical role of breaking down expert hierarchies and elites, giving outsiders the instruments for challenging the status quo and taking new directions.

The above already indicates that the *pars construens* of Fuller's argument is far removed from McIntyre's plea for a return to (imaginary) "good old days" of ordered relations between science, politics and society, as it aims to offer a "project for the post-truth condition" (as the title of a chapter of the book reads). Such project can be schematized in three steps.

First, one has to recognize that there is a problem with the academic outlook on truth searching, which makes it "not obvious that left to their own devices academics will necessary explore, let alone, exploit, all that is knowable to the fullest extent" (Fuller 2018, 69). On one side academics tend to give more relevance to the journey than to the usable results they produce along the way. On the other, as testified by the difficulties of interdisciplinary work, there is a rent-seeking tendency whereby disciplines come to 'own' a field, controlling access to and use of related knowledge, leading to ostensibly large amounts of "undiscovered public knowledge" (Fuller 2018, 70). Outside academy, however, there are "academically trained and interested parties" (Fuller 2018, 7) provided with a "strong sense of success" (Fuller 2018, 81) and committed to unleashing the "Promethean potential" (Fuller 2018, 92) of such knowledge. Fuller calls these "the military-industrial will to knowledge" (Fuller 2018, 81), whose hub is represented by the corporate foundation and whose organizational form coincides with the "mode 2", "post-academic" or "triple-helix" model of knowledge production.

Second, in the post-truth world science is undergoing a sort of Protestant Reformation. It is becoming "Protscience", that is science "taken personally […] as a life-shaping form of knowledge", whereby self and world are rearranged "to enable one to live – or die, as the case may

be – with whatever one happens to believe" (Fuller 2018, 107). Protscience indicates that science is now "the target rather than the agent of secularization", as a result of its "increasing visibility in public affairs, [which] coincid[es] with the ability of people to access the entire storehouse of scientific knowledge from virtually any starting point on the Internet" (Fuller 2018, 108), their increased education and the acknowledgment that science is increasingly relevant to their lives. Thus, "in the age of Protscience, the public continues to fund scientific research [yet] without being bound to the scientists' own interpretation of their findings" (Fuller 2018, 118).

Third, consistently with the above, science has to become, and is actually becoming, "customized". Customized science "consists in idiosyncratic interpretations and appropriations of scientific knowledge that, to varying degrees, contradict the authority of expert scientists" (Fuller 2018, 7), building on the distinction "between what one 'knows' (that is, has learned), and what one 'believes' (that is, acts upon)" (Fuller 2018, 184). As a result, the relation between expert and layperson is reshaped in terms of a deal between manufacturer and retailer "so that, say, a doctor comes to regard a patient in her clinic as more like a client who needs to be sold on a treatment than a machine that needs to be fixed" (Fuller 2018, 110). Science *customers* are not necessarily science *consumers*; they can make any use of the knowledge purchased and "assume responsibility for their science-based decisions" (Fuller 2018, 120).

6. Critical Remarks

Fuller's case should be at this point sufficiently clear, and the reader familiar with this author may have recognised themes he has developed elsewhere. His outlook builds on a critique of academy, the subscription to the basic principles of liberalism (with or without the "neo" prefix it depends on how one assesses Fuller's plea for self-entrepreneurship and responsibilization and for the market as the social institution more capable of delivering public goods), and a strong leaning towards Schumpeterian "creative destruction", risk-taking vs. risk-avoidance, and proaction vs. precaution (see e.g. Fuller 2000, 2002, 2010; Fuller and Lipinska 2014). For him, taking responsibility for innovation means that, since "innovation is inevitable" (Fuller 2018, 179), one is to address it in a "precipitatory", rather than anticipatory way, that is, by building on the assumption that "some harm will be done, no matter what course of action is taken, and that the task is to derive the most good from it" (Fuller 2018, 175). The age of post-truth, then, sounds like a call for embracing this challenge and opportunity.

Fuller's take on STS and post-truth is likely to elicit controversy, if not outright dismissal by the "politically correct STS practitioner" (Fuller 2018, 59) he criticizes. However, one has at least to admit that his outlook

is refreshingly different from those largely dominant both outside and within STS, examples of which I discussed above; and that his critique of STS as "talking the talk without making the walk" may be crude but is not ungrounded. Then, some critical remarks may help further reflection on STS and the present and prospective role of science in public affairs. The first four points below address Fuller's argument without taking sides about its normative grounds. A last one, instead, is explicitly normative in character.

First, I think Fuller underestimates the role of power differentials in the struggle over the definition of the actual and the possible. It seems to me that the most effective use of post-truth is made not by the outsiders but by the elites themselves. If we compare, for example, those who contest the scientific (rather than commercial and organizational) grounds of imposing precisely ten (rather than eight or twelve, or whatever) simultaneous vaccinations with those who contest the existence or the anthropogenic origin of climate change, who has been more successful so far? Or, to stay within a same field, let's consider agroecology supporters and Big Pharma. The former make a case for putting on an equal footing farmers' on-field expertise and acquaintance with local conditions and biotechnologists' lab-focused and generalist insights. The latter makes a case for the simultaneous equivalence (to avoid specific regulation) and difference (to get property rights) of genetically modified crops, compared with non-modified varieties. Which of the two has been so far more successful? Isn't Big Pharma's strategy a textbook example of post-truth? The metaphor of the lions and the foxes is too schematic. Lions can be as astute as (or even more than) foxes, and the advent of post-truth indicates that they are increasingly inclined to behave accordingly. Like Jasanoff and Simmet, Fuller underestimates the resources of "right-wing postmodernists", which makes revolting against elite protection of the status quo more complex than showing that the king is naked. The illusion which Fuller seems to incur is that, once "gone meta", the game can be played on an equal footing, whereas it is likely that power differentials will reproduce themselves on such level as well. I can subscribe to the criticisms he addresses to expert gatekeeping and academy rent-seeking, yet the "democratization" of knowledge promoted by post-truth is less at risk of leading to chaos than to subtler forms of domination. To avoid being beaten at their own game, opponents of the ruling power – as the geographer Neil Smith once said (see Smith 2005) – should always be one or more steps ahead of their target: in our case going further meta, or maybe just stepping out of the meta race. In the same vein, the idea of science customization, its transformation into a relationship between sellers and buyers (that is the opposite to Jasanoff and Simmet's deliberative democratization), may lead the latter to feel they are lord of their own life; yet, such feeling is often likely to be more an illusion than an actual reality, as it happens whenever customers are given the impression of purchasing something they really choose and want. The market has its virtues, but it's

good to keep in mind also its vices.

Second, I am not sure that academy's focus on teaching may work today as a means for breaking hierarchies and challenging elite power. Academy's growing commitment to research is the outcome of a long historical process culminated in the affirmation of the "triple-helix" model and neoliberal regulatory interventions, with the ensuing obsession with performance indicators and fund raising, pressure of corporate agendas and use of low-paid precarious academic workers (Lave et al. 2010). Focusing on teaching might be a way for university to get rid of that, yet at the price of becoming a place where students are given textbook notions reflecting science totally produced elsewhere, according to choices which the market is unlikely to rank according to the interests and concerns of the less affluent segments of society.

Third, as in previous work (Fuller and Lipinska 2014), Fuller makes a case for proaction vs. precaution, risk-taking vs. risk-avoidance, or precipitatory vs. anticipatory governance, as if the latter term in each binary were presently the rule. Yet, the success-oriented notion of truth has not only been dominant for long (following the likes of Adorno and Heidegger, one should say it is inbuilt in the DNA of modern science), but has intensified to the point that, as Alfred Nordmann (2017) has stressed, current techno-scientific truth has little to do with traditional scientific truth. The guiding image of the former, Nordmann notes, is of a reality that lies not beneath but beyond detectable phenomena – a vanishing point of perfect control. Truth, in this framework, is no longer a matter of *archetypes* to be theoretically represented, tested, corrected and elaborated further, but of *prototypes* to be made, produced and introduced in the world. Truth, we could therefore say, has today less to do with Descartes, or Popper than with Giambattista Vico's claim that "the true and the made are reciprocal or convertible" (*verum et factum reciprocantur seu convertuntur*); that "the true is precisely what is made" (*verum esse ipsum factum*). Moreover, with the advent of neoliberalism, risk-taking (or hazarding) has become the default or recommended choice at any level, public and private, collective and individual. The uneven distribution of decision power and of the exposition to unwelcome consequences has been managed through the spread of exonerating clauses from liability for "unpredictable" events (what Ulrich Beck has called "organized irresponsibility"), under the assumption, which is a cornerstone of Fuller's standpoint, that innovation is ultimately beneficial to each and every one, including those negatively affected, hence risk-taking is morally sound. In this framework, one can agree with Fuller that there should be a correspondence between decision-taking and consequence-bearing, and the rise of post-truth might indicate a thrust in this direction, but I am less optimistic than he is that a fairer balance is under way. A clue comes from the EU-promoted "responsible innovation" approach, which Fuller reads as consistent with precaution whereas in my view it rather follows his idea of precipitatory governance. Gathering to-

gether social actors (say Big Pharma vs. consumer, farmer or patient associations) to discuss and decide how innovation is to be developed while leaving untouched the respective dramatic differentials in agency means amplifying, rather than reducing, "organized irresponsibility". The narrative of responsible innovation is: "we share the decision, we share the consequences". Yet, if power differentials are left as they are, neither of the two assertions is remotely likely to correspond to reality when the stakes are real (Pellizzoni, in press).

Fourth, Fuller develops his argument on an epistemic level, as testified by his definition of modal power as "control over what can be true or false, which is reflected in intuitions about what is possible, impossible, necessary and contingent" (Fuller 2018, 188), whereas it seems to me that post-truth implies and expresses ontological struggles. Any truth claim, of course, has ontic stakes, as it asserts something about the state of reality, affecting as a consequence the course of the events by rearranging, as Fuller says, the interface of self and the world. However, one thing is to say that reality can be detected and assessed in different ways, and that this produces real consequences; another that reality itself can be led to match one's knowledge claims. Modal power takes in the second case a properly ontological import. Due to space limitations, I will not expand on an argument I have developed elsewhere (Pellizzoni 2016), but suffices it to note that a vast intellectual movement, sometimes called "new materialism" (Coole and Frost 2010), has in recent years built on how, in a number of techno-scientific fields, traditional dualisms (subject/object, mind/body, knowledge/matter, real/virtual, living/non-living, organic/inorganic etc.) get increasingly blurred. This ontological shift, which involves both the natural and the social sciences and humanities, is not without consequences for the vicissitudes of truth, as it has entered influential narratives. When, for example, the champions of the Anthropocene maintain that "nature is us" (Crutzen and Schwägerl 2011) or that we are eventually "liberating ourselves from nature" (Arias-Maldonado 2013; Breakthrough Institute 2015), in the sense that nature can legitimately be reframed as an internal differentiation of society or technology which, as with so-called 'ecosystem services', can be 'let alone' to be put at work as such, they are shifting the post-truth game to a different level: one where there is no residual layer of 'hard' reality to hamper the appropriative thrust of powerful agents. Similarly, when one considers the rise of a form of anticipation, 'pre-emption', which is neither precautionary nor proactionary in that it does not follow a linear conception of time but one where past, present and future remould each other, then the idea of "retroactive truth" (Massumi 2007) takes a meaning that looks quite different from an Orwellian rewriting of history, as the past is not just *reinterpreted* but becomes a place where different things *have happened*, compared with previous accounts (Pellizzoni, in press).[3] From this perspective – as critics of post-truth claim, but for reasons that to my knowledge they do not consider – we may be faced not with an emancipatory thrust, but with

a season of ever-more nightmarish elitism and oppression.

Which leads me to the last point: a normative one, as anticipated, hence not amenable to agreement or disagreement on the same basis as the previous ones. As said, and as made clear also in his previous work, Fuller subscribes to the two interconnected driving principles of modern (techno)science: namely, that truth corresponds to success in transforming the world according to the needs and wants of an ever-expansive human subjectivity, and that for this reason innovation is always ultimately beneficial to all. Yet, to tackle the hardly unlikely scenario hinted above, time has possibly come to seriously reflect on these assumptions, challenging their TINA ("there-is-no-alternative") status. Once admitted that the eventual universal benefit of innovation may not necessarily come true, one might proceed with exploring the possibility of science and technology policies where "choosing not" (to do, make or achieve something doable, makeable or achievable) is really an option. Note that "choosing not" differs from applying precaution, since the latter corresponds to saying "I would like, but am afraid", while the former corresponds to saying "I prefer not", or "I am not interested". Along this way, one might also start wondering whether another science is possible, that is, one whose attitude towards the world, hence whose criteria of success, are of another sort, which is different from pretending, as it happens now, that "alternative" methods and practices have to pull off exactly the same material results as dominant ones (Hacking 2000).

7. Conclusion

This paper had no pretence to offer a comprehensive overview of the debate over the relationship between post-truth and STS. What should result, however, is that critiques from outside and from within STS such as those addressed either revamp supposedly settled discussions on the epistemic legitimacy and societal implications of science deconstruction, or reiterate arguments for a more inclusive generation of public facts that fail to take stock of how the situation has evolved. Fuller stands out as a dissonant voice for both his diagnosis (post-truth is not a disease of society but a sign of its good health, and STS should feel proud rather than ashamed of its midwifing role) and therapy (one is to draw from post-truth its full implications concerning the institutional rearrangement and the social role of science). However, he also fails to take full stock of the situation, and namely how the game of truth has shifted from the epistemic to the ontological level, reality being increasingly accounted for as fully conformable to the will to knowledge. In a society characterized by growing inequalities and power differentials, this means that the equation between post-truth, customized science and individual freedom and autonomy is a bit hurried.

From this perspective, post-truth may be regarded as fashionable top-

ic of passing relevance, yet it draws attention to an emergent challenge for STS: how to rethink itself to deal with a world where neither a further "democratization" of science nor a (re)turn to well-guarded cognitive fortresses is likely to guarantee progressive research and political agendas.

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[1] In the former case, the argument is that it is prudent to avoid drastic restrictions to extractive and industrial activities, which would entail giving up major benefits, before getting "sound" scientific evidence of their effects on climate. In the case of "pre-emptive war" in Iraq, the argument works in reverse, according a straightforward understanding of precaution: waiting to get full-blown evidence of weapons and of Saddam Hussein's hostile intentions would entail a dangerous postponement of reaction.

[2] I have elaborated elsewhere on the difference between the role of the scientist and of the expert (Pellizzoni 2012). Though Fuller does not make it explicit, his account of expertise seems to be in accordance with such distinction, as he notes that "expertise should be seen primarily in sociological rather than strictly epistemological terms, [… since] the expert's decision licenses a train of other judgements and actions that attempt to align the world with the decision" (Fuller 2018, 161).

[3] The textbook case remains G.W. Bush's (2002) claim that removing Saddam Hussein was the right thing to do, since in this way Iraq has become what justified such very action.