2 Post-truth or pre-emptive truth?

STS and the genealogy of the present

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Introduction

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"). STS has found itself at the centre of the storm, witnessing a revitalisation of discussions concerning the legitimacy and implications of social inquiry into the production of scientific knowledge. Though debates over post-truth address a number of topics, including the impact of traditional and new media on public opinion and the health of contemporary democracies, 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 theorised 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 the questioning of the privileged status of scientific knowledge is at the centre of the post-truth debate, the calling into question of STS is hardly surprising.

By enunciating the symmetry principle, whereby "true" and "false", successful and unsuccessful, knowledge claims should be treated the same way with regard to analysing the processes leading to their emergence, the sociology of scientific knowledge (SSK) had questioned 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,

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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.

To a significant extent, the STS/post-truth debate may look like a continuation of such line of critique. However, we are not faced with a mere reiteration of older discussions, for at least two reasons. One is context. Post-truth emerges after, and as an overturning of, decades of growing emphasis on "evidence-based" decision-making (Marres, 2018); an emphasis that critical scholarship has identified, under the label of "post-politics", as an evermore distinctive trait of neoliberalism (e.g. Mouffe, 2005; Swyngedouw, 2010).[1] Then, as neoliberalism is hardly over, one should ask what lies behind what appears a complete reversal of its governmental strategy. A second reason is the focus of discussions. Commentators typically frame post-truth as an epistemic issue, seeing in the symmetry principle the basic point of contention. Hence the feeling of déjà vu sparked by the debate. Yet, as I will argue, a more fitting perspective for addressing post-truth is ontological. Post-truth concerns the statute of reality, rather than, or before, what can be said about it. In this sense, Trump Advisor Kellyanne Conway's (in)famous claim about "alternative facts"[2] should not be scoffed, but taken as an indicator that something has happened to the relationship between knowledge and things that is deeper and fraught with greater political implications than discussions of post-truth seem generally ready to acknowledge.

To make my case, I start with reviewing some takes on post-truth, from outside and from within STS. I proceed with reflecting how pointing to the symmetry principle as the *trait d'union* between post-truth and STS – as such takes do – fails to acknowledge that a gulf separates SSK, still heavily indebted to postmodernism, and generalised symmetry, with which Actor-Network Theory (ANT) expresses and contributes to promoting a vast intellectual change, whose basic trait is an attack on the dualisms foundational of western modern ontology, beginning with the language/matter one, and which a genealogical reconstruction allows to connect with post-Fordist capitalism and neoliberal rule, with special reference to military and security issues and the government of technosciences. Building on, or, more precisely, *intensifying* (a term whose meaning and significance will be accounted for later) a trend emerged in the 1970s, a novel political rationale took shape, I argue, since the 1990s gaining momentum in the aftermath of 9/11. Accordingly, rather than post-truth as an issue pertaining to the epistemic level, one should arguably talk of pre-emptive truth. The latter consists in the adjustment of words and things, knowledge and reality – beginning with the past – according to reactionary purposes. The challenge ahead for STS, I conclude, is to keep open the possibility of critique by working out a form of perspectivism that steers clear on one side from traditional naturalism and on the other from the full contingency of the encounter of matter and cognition.

Post-truth, STS, and the symmetry principle

Let's consider first what can be regarded as an example of the attacks on STS from the outside. Similarly to the *Oxford Dictionary*, the philosopher of science Lee McIntyre defines post-truth as an "eclipse of truth", in the sense of the growing irrelevance of truth 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). This, for McIntyre, is happening because of 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, he contends, is an offspring of science studies, namely the "strong programme" of SSK, with its claim that "all theories – whether true or false – should be thought of as the product of ideology" (McIntyre, 2018: 129). In its turn, SSK is an offspring of postmodernism, with its claim that everything can be treated as a text, open to interpretation. Postmodernists, notes McIntyre, regarded their move as "emancipatory" from cultural and social hierarchies. What they did not foresee was the rise of a "right-wing postmodernism", that is reactionary forces who learned from postmodernists how to undermine unwelcome scientific evidence. Post-truth is an effective application of this lesson.

This account, in my view, is a good example of the confusion surrounding much of the debate over post-truth. On the one hand, different positions about truth are conflated, namely: *disbelief* in truth, which corresponds to anti-realism, either methodological (one cannot describe things "as they are") or metaphysical (what we define as real depends on our minds or conceptual schemata); *disregard* for truth, which is compatible with straightforward realism, as with Max Weber's "value rationality", whereby one sticks to a certain principle against all odds; and the *undermining of unwelcome evidence*, which does not necessarily mean devaluating science – indeed, as the smoke and climate change cases precisely show, manufacturing uncertainty entails emphasising its relevance, stressing that rival positions lack conclusive evidence (Michaels, 2006; Oreskes and Conway, 2011). On the other hand, postmodernism is claimed to rule out the possibility of truth claims. Yet, taking for example, Foucault (one of the champions of postmodernism, according to McIntyre), his idea of critique is based on a deflated account of truth claims, seen as building on socially and historically positioned perspectives (Foucault, 2007), which does not mean they consist in mere "assertions of authority" (McIntyre, 2018: 126). I'll come back later to this account of critique. Thirdly, targeting postmodernism, that is an intellectual wave whose decline began decades ago, as responsible for the rise of post-truth means leading the discussion back to the science wars of the 1990s, neglecting what has happened since, in particular how

postmodernism's simultaneous attack on Cartesian objectivism *and* confirmation of the latter's dualist ontology by simply inverting the dominant polarity (in the access to reality language has pre-eminence over materiality, rather than the vice versa) has been superseded by a different account of the relationship between words and things. I'll elaborate later also on this.

As for debates internal to STS, prominent scholars took different positions (Rommetveit, this volume). Collins, Evans, and Weinel basically concur with McIntyre, blaming STS for having, if not exactly caused, at least eased the rise of post-truth. For them, "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, Evans and Weinel, 2017: 581).

Sergio Sismondo rejects such accusation, claiming 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 a 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 emergence of a post-truth era might be more possible than most people would imagine" (Sismondo, 2017: 3).

Similarly to Sismondo, Michael Lynch defends STS, yet building on different arguments: on one side, he stresses, the symmetry principle is "not a metaphysical position but a procedural maxim" (a "style of explanation"), 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); on the other, SSK's symmetry principle has been long superseded by ANT's "generalised symmetry"; hence, it cannot be indicated as the connecting point between STS and post-truth.

Sheila Jasanoff and Hilton Simmet see in the emergence of post-truth the expression of "moral panics about the status of knowledge in the public sphere" (Jasanoff and Simmet, 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" (Jasanoff and Simmet, 2017: 752), and that judgements of truth are always premised on judgements of worthiness. That knowledge and social order are co-produced is for them a key finding of STS. Their recipe against post-truth is consequently not "to get more science and truth back into the public's uneducated, misled or distracted minds" (Jasanoff and Simmet, 2017:

760), but to expand accountability for and inclusion in the selection of relevant concerns and generation of related public facts. Noortje Marres (2018) makes a similar – not exactly novel – plea for a more inclusive validation of experimental statements, against attempts at restoration of traditional expert authority.[3]

Steve Fuller introduces a dissonant voice in this choir by both considering STS as largely responsible for the emergence of post-truth *and* celebrating the latter as a valuable achievement of society – a sign of its health and dynamism, rather than disease. STS is blamed, instead, for "talking the talk without walking the walk", that is for recoiling from the post-truth tropes (with special reference to the contingent, manufactured, negotiated status of consensus over interpretations, or what counts as relevant expertise), it actually "routinised in its own research practice, and set loose on the general public, […] whenever such politically undesirable elements as climate change deniers or creationists appropriate them effectively for their own purposes" (Fuller, 2018: 59). Rather than an expression of anti-scientism, Fuller claims, post-truth indicates people's acknowledgement of the crucial role science plays in their life; hence, how it cannot be left entirely to expert elites, becoming a matter of personal responsibility – taking for whatever one decides to believe, living accordingly, "or d[ying], as the case may be" (Fuller, 2018: 107).

Generalised symmetry, new materialism, and the government of technosciences

Johan Söderberg (this volume) stresses that the positions above are all committed to defending the symmetry principle, seen as a foundational STS tenet. Such defence is either explicit, as with Collins, Evans, and Weinel, Sismondo and Lynch, or implicit, as with Jasanoff and Simmet's reaffirmation of the inseparability of science and politics or Fuller's attack on how investigations of manufactured uncertainty, such as Naomi Oreskes's, reinstate an asymmetry between "the *natural* emergence of a scientific consensus and the *artificial* attempts to create scientific controversy" (Fuller, 2017). For Söderberg, behind the defence of the symmetry principle lies the fear of a return of ideology critique, which for STS is anathema as much as it was for the poststructuralist scholarship that provided STS with its main theoretical underpinnings. STS, he notes, gained academic legitimacy by combining the value neutrality of the method, which allowed taking distance from Marxist critique of capitalist science, with the normative commitment implied in the assumption of a direct correspondence between epistemic authority and political power. This assumption entails that unmasking the groundlessness of the former would correspond to supporting socially marginalised actors. Yet, post-truth shows how the opposite is increasingly the case. Hence, Söderberg concludes, in accord with a host of critics of the depoliticising implications

of ANT (e.g. Hornborg, 2017; Mills, 2018) – tackling post-truth entails reintroducing some form of asymmetry.

That the symmetry principle plays a major role in the post-truth/STS debate is hardly doubtful. However, it is interesting that, in the accounts above, the distinction between SSK's (restricted) symmetry and ANT's generalised symmetry is either missing or not followed up, as if the latter was a mere extension of the former. Yet, the entry of nonhuman actants onto the scene signals a major shift in the understanding of reality, by no means limited to ANT, but of which ANT represents an indicator and, given its influence within and outside STS, an important trigger.

To grasp the relevance of this shift, one has to adopt a genealogical outlook, moving from a classic history of ideas, focused on how SSK developed out of a critique of the weaknesses of the Mertonian sociology of science, and ANT out of a critique of the weaknesses of SSK (see e.g. Mills, 2018), to a concern for what Foucault (2001) calls *problematisations*: the social, cultural, economic, and political conditions that make it possible, in a given historical period, for certain types of questions to arise and certain types of answers to become conceivable. In a Foucaultian perspective, moreover, "the emergence of new modes of power happens through the lightening, saturation, becoming – more – efficient, and transversal linkage of existing practices […] [up to] tipping points […] where the object or subject mutates into another form" (Nealon, 2008: 38–39). In other words, more than a revolutionary upheaval, the shift to a new problematisation, a new governmental rationale, is to be conceived as the intensification of elements pertaining to the ruling order, up to the point in which they become something different.[4]

This outlook offers a valuable clue to how to perform an analysis that, without drawing the former to the latter in a simplistic base/superstructure manner, traces parallelisms between the evolution of ideas and intellectual movements on one side, and social and political change on the other.[5] This type of analysis has been notably applied to account for how post-Fordist capitalism has been able to resolve to its own advantage the socio-ecological crisis of the 1970s, integrating on one side the "artistic critique" raised by intellectuals and social movements against the rigidity and verticality of the Fordist mode of production (Boltanski and Chiapello, 2005), and on the other, the theories of complexity and disequilibrium that had been emerging in a variety of fields, from ecology to chemistry, physics, biology, cybernetics[6]. These theories also contained a libertarian critique of the post-war social order, but were used in support of the neoliberal attack on welfare and socio-economic planning (Walker and Cooper, 2011; Nelson, 2015).

As regards the shift from (restricted) symmetry to generalised symmetry, one has to look within poststructuralism to trace indications, roughly contemporaneous to the above, of a progressive detachment from the predominance structuralism had assigned to language over materiality towards more fine-grained accounts of the interconnection between words

and things. A first step in this process is readable, for example, in Foucault's shift from an archaeological to a genealogical perspective. If Söderberg is correct in describing SSK's normative assumption as the "knowledge = power formula", this in my view hardly applies to ANT. The Foucaultian resonances of the latter are explicitly acknowledged by its main instigators (Latour, 2005; Law, 2008), and at least in Foucault's writings of the 1970s and early 1980s, the formula is not knowledge = power, but power–knowledge or power/knowledge, the dash or slash indicating that knowledge and power are to be conceived as reciprocally constitutive, enabling, and constraining, knowledge being an exercise of power but also power a function of knowledge.

But it is a further step, or intensification, in the process of detachment from the pre-eminence of language that is especially interesting here. At the end of the 1990s, various authors were detecting a tendency in cutting-edge scholarship to move away from the idealist end of the idealism–materialism axis, and towards the materialist one, yet not in terms of a return to traditional realisms but of conceiving human actors "as mutual constructed/constructing the other actors, including texts, graphs, buildings, money and machines" (Dean, 1998: 191); an approach whereby "not only must society be studied as constitutive of nature and vice versa, but nature must be understood as an actor with a conjoined materiality with society" (Goldman and Schurman, 2000: 565). STS has been constantly at the leading edge of this movement, which gained momentum in subsequent years in philosophy, social sciences, and the humanities, to be christened at some point the "ontological turn" (Woolgar and Lezaun, 2013) or "new materialism" (Coole and Frost, 2010; Dolphijn and van der Tuin, 2012). Apart from ANT, one may recall for example Andrew Pickering's (1995) and Isabelle Stengers' (1997) elaborations on the contingent, assembled character of experimental evidence; Sheila Jasanoff's (2004) introduction of the notion of "co-production" of science and the social order; Annemarie Mol and John Law's case for knowing as enacting a version of, rather than describing the state of, the world, hence for the multiple character of reality (Mol, 1999; Mol and Law, 2006).

The main characteristic of this intellectual strand is the attack on the dualisms characterising western modern ontology – mind/body, subject/object, natural/artificial, sensuous/ideal, living/non-living, masculine/feminine, active/passive, and so on – as theoretically untenable and normatively blameworthy for their dominative implications, any binary entailing the pre-eminence of one pole over the other (Pellizzoni, 2016). Target of criticism is especially the language/matter duality, which, as noted, postmodernism had not questioned but simply inverted in its dominant polarity. The claim that language has been granted an "excessive power […] to determine what is real" (Barad, 2003: 802) is common in new materialist literature, in explicit contrast with the culturalist leaning of postmodernism. Attention, thus, focuses on Foucauldian insights into the materiality of power

dispositifs, the phenomenology of bodily experience of Merleau–Ponty, theories of immanence like the late Deleuze's, long neglected philosophies of nature like Whitehead's, and ANT, which attracts interest well beyond STS. Source of inspiration is also the anti-naturalism found in non-modern or non-western ontologies (Viveiros de Castro, 2014; Descola, 2014). Yet, it is notable how the material turn is often perceived to be instigated by changes in scientific accounts of reality (Barad, 2007; Coole and Frost, 2010; Kirby, 2011).[7] The deconstruction of the language/reality binary, it is stressed, is "in line with contemporary science and with contemporary turns to life and living systems" (Colebrook, 2011: 3). The reference is to how, in a variety of fields, phenomena are being increasingly conceptualised in terms of porous boundaries and blurring distinctions: from epigenetics' challenge to the gene/environment and brain/body dichotomies (Papadopoulos, 2011) to how the inorganic realm is increasingly depicted as having vital connotations, life being simultaneously infused with dematerialised characterisations – textuality, information, codification (Keller, 2011); from the way mining and processing of huge amounts of data generate unforeseen insights where knowledge and production of reality can hardly be distinguished (Calvert, 2012) to how the penetration of computational processes "into the construction of reality itself" (Hayles, 2006: 161) brings into question the divide between machine and organism. Given all that, it is stressed, it is "impossible to understand matter any longer in ways that were inspired by classical science" (Coole and Frost, 2010: 5). Matter is hardly inert, stable, resistant to socio-historical change. It instead exhibits agency, inventive capacities, generative powers; a "viral life" that "problematize[s] the assumed distinctions between the physical and biological sciences" (Grosz, 1999: 8). It is a doing, an incessant becoming (Barad, 2007; Grosz, 2011).

In sum, poststructuralism distinguished itself from structuralism by increasingly complicating the relationship between words and things, up to a moment where the very distinction between language and matter was brought into question and the ontological turn took off. As we have seen, this is how Foucault describes the shift from a power arrangement to another, the intensification of some traits of the former engendering at some point a qualitative shift, which usually keeps them while giving them a new meaning and function. What is crucial to the present discussion, and makes it possible to talk of a common problematisation, is that these intellectual developments have occurred in concert with the evolution in the government of technosciences. Biotechnology arguably played a central role here. Its fundamental feature is the combination of biology and information science. As a result, life has come to be conceived as simultaneously matter and information, presence and pattern, "wet" and "dry", real and virtual; something capable of moving fluidly from living cells to test tube, to digital databases (Thacker, 2007). On the regulatory side, biotech patenting has come to designate, and legally protect, ontologically ambiguous entities, oscillating between materiality and virtuality, thingness and cognition, rights

over information and rights over the organisms incorporating such information (Calvert, 2007). Moreover, the claim that patented artefacts are indistinguishable from nature for any practical purpose has entailed that artefacts can be simultaneously described as identical and different (more usable, more valuable) to natural entities, while corporate storytelling has conveyed the message that biotech is just a more accurate continuation of what humans did for thousands of years, or nature always did, "the 'technology' in these practices [being] nothing more than biology itself, or 'life itself'" (Thacker, 2007: xix) – hence, nature is technology, and technology is nature, through and through.

A similar ontological blurring can be found in other policy fields. Carbon trading, for example, builds on the establishment of a conversion rate between the "global warming potential" (GWP) of CO_2 and other greenhouse gases, so that reducing one of these gases here can be regarded as equivalent to reducing CO_2 there (MacKenzie, 2009). In this scheme, GWP is simultaneously symbol and matter, means of exchange and physical phenomenon, cognitive construction, and feature of reality. In turn, so-called "payments for ecosystem services" (PES)[8] break the distinction between commodity and non-commodity. Commodification traditionally entailed human extractive and transformative intervention (the separation of valuable "pieces" of nature from their milieu, and their reworking and combination). Now commodities are created without even touching things (indeed, precisely because of this), by means of just renaming, classifying, and measuring them as services that can be sold and bought (Robertson, 2012; Büscher, 2013) – hence, they were commodities *since the beginning*, only as yet unrecognised (Pellizzoni, 2021).[9] Consider also climate engineering, and in particular "solar radiation management" (SRM). The idea, as well-known, is that, if emissions cannot be reduced at the rate and magnitude needed to produce significant effects, then, at least to buy time, a solution that promises to be cheap and quickly productive is to reflect solar radiation, through rather mundane technologies, such as launching giant mirrors into space, spraying sulphates into the stratosphere, making clouds brighter by spraying seawater into the air, and so on (Keith, 2013). The point is that, given the chaotic character of the atmosphere, it is impossible to predict with any degree of reliability the actual effect, either local or global, of such applications (Macnaghten and Szerszynski, 2013). SRM, therefore, is a strange type of technical fix; something which fixes by non-fixing, indeed by letting loose(r), a system, as it points on reacting and adjusting on the spot to the elicited swerves of the latter. The distinction between control and lack thereof blurs. SRM intensifies, bringing it literally to a planetary scale, the neoliberal argument about the limits of prediction and planning faced with social complexity, the empowering character of uncertainty and the social value of the brave entrepreneur, capable of riding (hence adding to) it, thanks to "nose", quickness in reacting, resilience, ability to apply practised judgement, and rules of thumb.[10]

The rise of pre-emption

Following scholarship that argues how the bio/ICT-based third industrial revolution, which allowed capitalism to relaunch accumulation after the 1970s crisis, has begun to lose momentum rather soon, making it incomparable with the second revolution, also because energy is becoming evermore costly to obtain (e.g. Bonaiuti, 2018),[11] it is not unreasonable to see in the burgeoning celebration of the virtues of uncertainty, entrepreneurial bravery and path-breaking innovation a repressed fear of secular stagnation, which financial speculation is increasingly unable to hide (cf. Rommetveit and van Djik, this volume). Be it as it may, if individual and social insecurity represent for neoliberalism a core governmental means (Dardot and Laval, 2014), its role has intensified since the beginning of the new millennium, engendering a qualitative shift in the governmental approach. Catalyser of the shift was 9/11 and the subsequent acceleration in a trend that global politics had followed since the previous decade, and more precisely since the Gulf War of 1990–1991. During this war, factual truth had shown early signs of sufferance (it was the first modern conflict where the press had no access to the theatre of operations, having to rely on the reports given by the US Army). Yet, it is in the aftermath of 9/11 that post-truth – or what, for reasons I am going to explain, I prefer to call pre-emptive truth – takes full shape. A passage of a speech delivered in 2002 by President G.W. Bush at West Point Academy is revelatory:

> If we wait for threats to fully materialise, we will have waited too long. We must take the battle to the enemy, disrupt his plans, and *confront the worst threats before they emerge* […]. Our security will require […] to be ready for pre-emptive action when necessary (Bush, 2002, emphasis added).

Consider also the following statement, attributed to Bush's aide Karl Rove:

> We're an empire now, and when we act, *we create our own reality*. And while you're studying that reality — judiciously, as you will — we'll act again, creating other new realities (quoted in Suskind, 2004, emphasis added).

What is outlined here is a type of action that entertains a peculiar relationship with the world – the aim is to "counter the unknowable before it is even realized" (Cooper, 2006: 120), creating an "own" reality – which Bush calls "pre-emptive".

Yet, what is pre-emption as a governmental rationale? A genealogical account has to start with considering that anticipation plays an important role in modernity. As effectively argued by Niklas Luhmann, modernity's orientation to the "new", that is a futurity conceived as open and actionable entails that one needs to anticipate it, identifying and selecting among

a surplus of possibilities. The development of probability, statistics, insurance, and social security responded to such need. Statistics "defuturizes the future without identifying it with only one chain of events" (Luhmann, 1976: 141), keeping uncertainty within a known threshold, deemed acceptable. Since the early nineteenth century, this becomes the dominant governmental way of relating with the future – from public health to retirement pensions, to industrial accidents (Hacking, 1990; Ewald, 1991). As an application of probabilistic prediction to undesirable events, prevention enters environmental regulation in the 1970s, being depicted as a preferable alternative to damage reparation.

The limits to risk calculation, however, had begun to be acknowledged already in the 1920s. For John Maynard Keynes and Frank Knight, economic decisions may escape probabilistic estimates, requiring subjective judgements and individual heuristics. Yet, they still consider incalculable uncertainty as the exception, rather than the rule. The rise of precaution in the 1980s, then, corresponds to a widespread acknowledgement that there are situations, engendered by the application of evermore powerful technologies, where threats are apprehended yet no proper risk assessment is possible, while postponing action might entail irreversible consequences. Note that both prevention and precaution conceive of a linear temporality: action in the present affects the future state of the world. And both build on a naturalist ontology (Anderson, 2010). The world is assumed to proceed "on its own", should action not take place, or to "react" to such action.

Pre-emption, in turn, gains momentum beginning in the late 1990s, in the field of the military and security (Cooper, 2006; Kaiser, 2015). Its rationale is that, to confront merely guessed threats, lacking even the inconclusive but robust evidence required for precautionary measures, one has to "incite" them, help them emerge, acting to create the reality that demonstrates such very action was sound since the beginning. Said differently, the process produces its own cause. "Some may agree with my decision to remove Saddam Hussein from power – claimed in 2005 G.W. Bush – but all of us can agree that the world's terrorists have now made Iraq a central front in the war on terror" (quoted in Massumi, 2007). In other words, removing Saddam Hussein was the right thing to do, since in this way Iraq has become what justified such action. The shaky, wrong, or plainly fraudulent grounds of the decision become irrelevant. Truth becomes retroactive, not in the sense of re*interpreting* the past in the light of the present (which would be nothing new), but in the sense of retro*acting* on it, making it become a place where different things have happened. The threat is generated by action, but its elicitation paradoxically demonstrates it was already present (Pellizzoni, 2020).

Thus, pre-emptive truth does not operate at the epistemic but at the ontological level. Better, it blurs the two – new materialists couldn't but approve of this, if perhaps grudgingly. The arrow of time is replaced by a more complex temporal structure; a sort of secular eschatology. The look forward, towards a future envisaged with various degrees of confidence, is replaced by a look backwards, from the certainty of the future to the action capable

of postponing or modulating its actualisation.[12] Pre-emption, therefore, shares with precaution the idea that the course of the events has to be significantly altered. Yet, while precaution conceives of such intervention as "separate from the processes it acts on" (Anderson, 2010: 789), pre-emption conceives of knowledge and reality as adjusting to each other, moving back and forth through time.

Precaution has been criticised for its conservative outcomes, as in the attempt to reduce the possibility of harm one gives up precious opportunities (Fuller and Lipinska, 2014). Pre-emption is positively *reactionary*. Everything can be transformed (including, and indeed beginning with, the past), yet within a threshold that cannot be crossed, since action aims precisely to push forward the eschatological event. Anything is permitted, provided that it does not threaten the status quo. Note, moreover, that pre-emption is not restricted to military and security issues, nor does it evoke only dystopian futures. Of particular interest for STS is how the same governmental machinery works in regard to the regenerative eschatology associated with technological change. Consider, for example, the dramatic leaps in productivity bringing about the end of hunger, or the optimisation of energy and chemicals leading to clean industrial agriculture, that biotech storytelling painstakingly repeats; or how the alleged convergence between bio-info-cogno-technosciences is claimed to disclose limitless opportunities of "human enhancement" (Roco and Bainbridge, 2002), for example, in terms of a blurring of the organic and the inorganic – something already happening with new prosthetics and brain–computer interfaces (Rao, 2013) – as bound to improve resistance to adverse environmental conditions. In similar cases, where, according to the narrative at play, technology is deemed capable of either (re)adjusting the environment to human life or of adjusting human life to a changing environment, the strategy is to lay on someone (environmentalists, religious traditionalists, opponents of the market forces, lack of far-sighted public and private investors, etc.) the blame for why the allegedly impending "disruptive" technological revolution has not occurred yet, the actual goal being rather to infinitely extend and modulate the present. Indeed, a revolution – if actually such – would by definition disrupt the ruling social order, which is precisely what pre-emptive anticipation aims to ward off (Pellizzoni, 2020).

Conclusion

If the argument developed here holds, we should look at post-truth as a manifestation of a process that began much earlier and can in turn be regarded as the intensification and qualitative change of a governmental rationality whose first steps date back to the 1970s. If such shift is today more recognisable, this is probably because expressed in an astonishingly crass way and in a context where media power has increased proportionately to the concerns over the destiny of democracy.

Neither of the STS takes on post-truth discussed above, whether disapproving or approving, seem to acknowledge, let alone tackle, it, in the terms suggested in this work. This is hardly surprising. Partaking in the same problematisation, it is difficult for STS (and more broadly for scholarship involved in the new materialist movement) or for those who linger with nostalgic portrayals of the scientific enterprise, to take the necessary critical distance, as this would require a profound reconsideration of the ontological presuppositions on which one builds. From this perspective, McIntyre's and Collins, Evans and Weinel's claims – that STS's views are objectively consistent with post-truth and that conservative and reactionary forces have learned how to use them effectively – are well-grounded, yet they miss the actual origin and character of the problem. Also well-grounded are the preoccupations of many, though the solutions some suggest seem again hardly adequate. Jasanoff and Simmet, like Marres and post-normal science scholarship, make a plea for an extension of public deliberation over technoscience. Yet, if the good old days of the unquestioned public authority of science (if they ever existed) are over, plenty of research testifies to how "participation" is the target of ever more skilled actors, who use it to promote their own agendas and hollow out opposition (see e.g. Wynne, 2008; Felt and Fochler, 2010; Irwin, Jensen and Jones, 2013; Ward et al., 2019). Moreover, that hopes be pinned on precaution, 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), is perhaps understandable in the American context, traditionally hostile to the precautionary principle; hardly so in Europe, where the ineffectiveness of precaution in bringing the animal spirits of global capitalism under control is in the public eye, the very notion of precaution having indeed virtually disappeared from the political lexicon to the benefit of (responsible!) innovation, competition, security, and green economy.

Fuller fails as well to see that the question of post-truth is not just located at an epistemic level. As for his belief that post-truth inaugurates a season of customisation of science, its refashioning as a relationship between sellers and buyers free from expert domination, Fuller neglects in my view how laypeople's growing capacity of "going meta", challenging the rules established by the elites to their own advantage, does not guarantee at all that the "game of truth" will be played on an equal footing. More likely, power differentials will reproduce themselves at the meta level. Customers are regularly given the impression of purchasing something they really want and choose; and, the more skilled they become in deconstructing communication, the more the persuaders work on such very capacity, in a race to going "more meta" than their target. Moreover, Fuller's case for risk taking as the only road to "progress" fails to take stock of how the success-oriented notion of truth, arguably embraced since the beginning by modern science *qua* empirical science, has been intensifying to the point that Cartesian or

Popperian accounts look evermore archaeological relics, while Giambattista Vico's claim that true is just what is made (*verum esse ipsum factum*) is increasingly high on the agenda. As Alfred Nordmann (2017) notes, the guiding image of techno-scientific truth is of a reality that lies not beneath but beyond detectable phenomena. Truth 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.

What deserves investigation, then, is the link between Nordmann's prototypical truth, post-truth *à la Oxford Dictionary*, and pre-emptive truth as discussed in this chapter, as they together outline the contours of the problematisation in which we live (and possibly we'll die, as Fuller says). In conducting such investigation, one has to bear in mind that things move on and pre-emption is taking novel routes. Observing cutting-edge social theory is again indicative. The burgeoning call is now for acknowledging the implications of the "intrusion of Gaia" (Stengers, 2018), the need to turn towards the "terrestrial attractor" (Latour, 2018), to inaugurate a "geological politics" (Clark and Yusoff, 2017) that recognises "geopower" (Grosz, 2011), the supreme indifference of geophysical processes and biological manifestations of "inhuman" nature such as viruses and bacteria, as fraught with major political consequences. Which? Is anything new in sight? Not a bit, it seems to me. Reading this literature one is faced – in a perfectly pre-emptive fashion – with the usual (neoliberal) call for preparedness and resilience; for relying on trial and error, flexibility, and "ongoing creative experimentation" (Clark and Yusoff, 2017: 18).

The anticipatory logic of preparedness is as well increasingly indicated as suited to addressing threats, like insurgent or resurgent pandemics, which, given their "emergent" (concealed, accumulative, eruptive) character, require constant alertness and vigilance (WHO, 2009; Lakoff, 2017). This character brings preparedness close to pre-emption, yet a difference seems to be that pandemic threats are not elicited but just expected. However, thinking of the debate over the Covid-19 crisis, on one side zoonoses are portrayed as inevitable and only manageable, as if no shift to a less exploitative and destructive attitude towards ecosystems was conceivable, let alone practicable. On the other, controversy over the origin of Sars-CoV-2 is fuelled by the development of "gain of function" research, that is, research focused on modifying viruses to explore their potential virulence or transmissibility, indicating that, the deeper and the more refined the intervention in the biosphere becomes, the more contentious ends up the distinction between the "natural" and the "artefactual". Yet, the more the controversy over the anthropic or non-anthropic origin of an entity proves to be irresolvable, the more, precisely for this, it appears irrelevant - which is basically what ag-biotech corporate storytelling claims. In short, also pandemic preparedness seems to be framed, or underpinned, by the governmental logic of pre-emption. Anything on the planet, from seeds to viruses, is drawn to the techno-capitalist ontology, pre-empting any meaning, before than any possibility, of change.

To conclude, post-truth might be regarded as a fashionable topic of passing relevance, yet in light of the discussion above, it draws attention to an emergent political and methodological challenge for STS. On one side, the task is to acknowledge that non-dualism is per se hardly conducive to emancipatory outcomes, and to deal with a world where neither a further "democratisation" of science nor a (re)turn to well-guarded cognitive fortresses is likely to guarantee progressive research and political agendas. On the other, the task is to rethink "asymmetry" without falling back to old forms of naturalism, and to develop a critical capacity that does not presuppose a view from nowhere. "New starting points" (Rommetveit and van Dijk, this volume) need not be invented entirely from scratch. Foucault, for example, made a case for an immanent critique, that is one which does not refer to a transcendental vantage point, yet builds on the minimal normativity provided by the lived unbearableness of being "governed *like that*, by that, in the name of those principles, with such and such an objective in mind and by means of such procedures" (Foucault, 2007: 44, emphasis original). And, within science studies, feminist standpoint theory has long sought to combine a realist approach with a stress on the situated character of knowledge (Harding, 2008). Said differently, perspectivism is neither equivalent to relativism nor with the impossibility of critique, though the task ahead is to work out a version of the latter that steers clear both from traditional naturalism and from the full contingency of the encounter of knowledge and things, or their mutual adjustment under the oversight of a dominative will.

Notes

1 Accounts of neoliberalism are notoriously controversial. A good working definition is the one proposed by David Hess: "public policies and economic thought that have guided a transition in many of the world's economies toward the liberalization of financial and other markets, the privatization of public enterprises, and the retrenchment of government commitments to social programs" (Hess, 2013: 178). Regarding science, this has entailed "a regime of organization quite distinct from the Cold War science management regime" (Lave, Mirowski and Randalls, 2010: 667), including a rollback of government support to public research universities, replaced by increased corporate funding, an aggressive promotion and protection of intellectual property, and the reframing of universities' mission as providers of human capital and competitive global service industries rather than educational institutions, with consequent expansion of non-tenured and post-doctoral positions.

2 Conway was referring to Press Secretary Sean Spicer's grossly inflated estimates about the size of the crowd attending Trump's Inauguration. See: "Conway: Press Secretary Gave 'Alternative Facts'", *Meet the Press*, 22 January 2017. Available at: www.nbcnews.com/meet-the-press/video/conway-press-secretary-gave-alternative-facts-860142147643 [Accessed 16 August 2019].

3 Faced with controversy over the origins and features of the Covid-19 pandemic, this plea has been renewed by appealing to the "post-normal science" case for a new, inclusive, social contract for science against the elitism of traditional "puzzle-solving" approaches to scientific inquiry (Waltner-Toews et al., 2020;

see Funtowicz and Ravetz, 1993). However, emergent changes in the approach to uncertainty, on which I dwell later, call into question a straightforward reiteration of the post-normal science argument.

4 In this sense, neoliberal governmentality does not withdraw but rather intensifies the distinctive elements of the liberal problematic of government (Foucault, 2008). So, for example, the liberal view of exchange as a natural tendency of humans which one is to leave free becomes the need to stimulate their latent competitiveness (Dardot and Laval, 2014). And the liberal view of the need to handle the dynamics of population and the environment becomes, as noted below, a plea for riding uncertainty and unpredictability.

5 The Foucaultian is not the only possible framework for such an endeavour. For example one may turn, as David Hess (2013) suggests, to Bourdieu's field theory; or to Ludwik Fleck's notions of thought collective and thought style. Of particular interest for understanding how a certain problematisation becomes established is the study of specific moments and loci where different scientific communities interact among themselves and with economic and political actors. In this vein, for example, Phil Mirowski (Mirowski and Plehwe, 2009) has addressed the role of the Mont Pelerin Society in the spread of neoliberal ideas outside academic circles, and Melinda Cooper (2008) has found in the Santa Fe Institute a site of exchange between economists, biologists, complexity and evolutionary theorists crucial to laying the foundations of bio-cognitive capitalism.

6 In ecology, the idea of equilibrium as the spontaneous tendency of ecosystems was replaced by competition, patchiness, fragmentation (Holling, 1973). In chemistry and physics, attention focused on "dissipative structures", that is, thermodynamically open systems characterised by the spontaneous formation of dissymmetry and bifurcations (Prigogine and Stengers, 1979). In cybernetics, notions of homeostasis and selective openness/closure were supplanted by the idea of emergence (Hayles, 1999). Contemporaneously, the notion of "trans-science" (Weinberg, 1972) was elaborated, with reference to issues escaping contained experimental settings; something later described as "post-normal science" (Funtowicz and Ravetz, 1993).

7 However, by no means should one think of a one-way conceptual migration. From evolutionary biology (Keller, 2002) to cybernetics (Hayles, 1999); from nanosciences (Dupuy and Grinbaum, 2004) to chemistry (Lehn, 2004) and immunology (Tauber, 1997), there is plenty of evidence of cross-fertilisation of the social and the biophysical sciences. Such process often begins with a metaphorical use of a concept, which, travelling across disciplines and problem-fields, comes step by step to gain a literal truth-content, around which theories are built that bear no memory of their origin (Stengers, 1987; Pellizzoni, 2014).

8 Ecosystem services are defined as the benefits biophysical systems give to humans, from resource provision to regulative and supporting functions like carbon sequestration, waste decomposition, soil formation, crop pollination, and also cultural ones, such as aesthetic, spiritual, recreational, educational, therapeutic (see Millennium Ecosystem Assessment, 2005). PES are defined as voluntary transactions by which owners are compensated by users for ensuring a service – say potable water – by maintaining the associated resource – say a catchment basin.

9 Of course this is not entirely new: tourist attractions work this way since the dawn of tourism. Yet, the idea of PES, as virtually applicable to everything, gives this ontological reframing an intensified, pervasive character.

10 This argument gained momentum from the 1990s. Studies have detected in influential managerial literature a growing celebration of uncertainty, danger, insecurity, volatility, disorder and non-predictive decision-making, seen "at the

heart of what is positive and constructive" (O'Malley, 2010: 502; for a typical example of such literature see Taleb, 2012).

11 This is testified by EROEI ("energy return on energy investment") calculations. Oil and gas EROEI declined from a ratio of 100:1 in the 1940s to the present 15:1. For shale oil estimates talk of a 3:2 ratio; for solar panels of 4:1 at best (Kelly, 2016). To put this in context, estimates for the US economy indicate that its growth is possible only if the primary energy system has a minimum EROEI of 11:1 (Fizaine and Court, 2016).

12 This non-linear temporal structure makes pre-emption cognate with a type of anticipation emerged with the Cold War, namely deterrence. Also deterrence crafts the world according to what action needs to be effective (Massumi, 2007), and makes the future at once impending and postponed, rather than averted (as with prevention and precaution). Yet, while deterrence builds on the knowledge and evidence of the threat, pre-emption builds on the indeterminate, latent character of the latter. This provides this type of anticipatory governance with an unprecedented generativity, which encompasses unintended consequences, deemed unavoidable and actually part of the effect (Anderson, 2010; Pellizzoni, 2020).

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