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The Genealogy of "Empirical Post-structuralist" STS, Retold in Two Conjunctures: The Legacy of Hegel and Althusser

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ABSTRACT   *Recent discussions in science and technology studies (STS) about the risks of science and technology have led to political economy occupying centre stage. Closely related to political economy as a field of investigation are a number of overarching concepts, such as class, capitalism and interest. However, reliance on such concepts is rejected in post-Actor Network Theory STS. This stand-off over overarching categories can be traced back to two conjunctures in the genealogy of STS. First, the influence of Hegel and his concept of "totality"; and second, the influence from anti-hegelian French epistemology with its celebration of the opposite concept, that of "multiplicity".*

Introduction

Is the world sufficiently unified and stable over time to be grasped with concepts? This ontological question has bearing on an epistemological question: what explanatory value should be given to overarching, theoretical concepts such as "society", "capitalism", "class" and "interests"? These questions mark a central divide in the science and technology studies (STS) research community. On one

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side of the fence, we find those STS scholars who draw on political economy concepts to explain the many risks engendered by science and technology. Fields of investigation that are not empirically related to one another, such as synthetic biology (Sunder Rajan, 2006; Cooper, 2008), pesticides (Kleinman and Suryanarayanan, 2013), pharmaceuticals (Davis and Abraham, 2010) and climate change (Böhm *et al.*, 2012; Jankovic and Bowman, 2014), have been subsumed under and explained by "capitalism", a concept pertaining to a single, overarching economic system. Though the writers taking this approach belong to different traditions and subscribe to no single label, for the sake of convenience I will refer to them in this paper as the "political economy" camp within STS.[1]

On the other side we find the post-structuralist camp. Here ontological priority is assigned to locally situated and emergent practices. From this tenet follows radical heterogeneity that cannot be grasped by any single, overarching concept. Post-structuralist STS writers reproach those who try to do so with having assumed that which should be explained (Woolgar, 1981; Whatmore, 2009). The dispute over the legitimacy of general, explanatory categories ties in with another topical issue that divides the STS community, namely the (im)possibility and (un)desirability of doing (ideology) critique (Latour, 2004). The two debates are intrinsically linked because critique presupposes concepts. It is with concepts that we can imagine a (better) alternative to that which is empirically given.

These bones of contention have been fought over for decades within the STS research community without any resolution in sight. However, with the expansion of post-structuralist STS theory into new disciplinary fields, such as human geography and environmental studies (cf. special issues: Rudy and Gareau, 2005; Davis and Zanotti, 2014; Foster, 2016), third-party interlocutors have been drawn into the fray. Some of them have intuited thematic overlaps between the political economy camp and the post-structuralist camp, and have concluded from this that the old dispute arises from a misunderstanding. These third-party interlocutors have put forward a number of proposals for a theoretical synthesis (cf. Castree, 2002; Gareau, 2005; Perkins, 2007; Silva, 2013; Hornborg, 2014). Concurrently, scholars subscribing to the post-structuralist STS camp (Law and Williams, 2014), as well as adherents of political economy approaches (Fine, 2005; Rudy, 2005), have expressed doubts about the feasibility of such a synthesis.

My own sympathies lie with the political economy camp, although I recognise that, depending on the subject matter and the purpose of an intervention, there can be merits in adopting either approach. In the article, I do not take issue with post-structuralist STS theory as such, but with the expansionist agenda pursued by a handful of writers belonging to this camp. Scholars in both camps can learn from each other, but a meaningful exchange must start with an "agreement to disagree" (cf. Bénatouïl, 1999). What is needed is lucidity about where one's own position overlaps with *and* differs from the other tradition, coupled with respect for the basic rules of scholarly debate. It is with the aim of clarifying the similarities and the differences between the political economy camp and the post-

structuralist STS camp that I put forward my central claim in this article: the dispute over the legitimacy of concepts (and critique) can be traced back to two conjunctures in the genealogy of STS.

The centre of gravity for that genealogy is Marxism in 1960s France. It should be noted that my analysis is not Marxist *per se*, nor am I addressing myself specifically to Marxists. If I place stress on this tradition, it is because of its omnipresence in French intellectual milieus during the formative years of the STS discipline. This claim might sound startling, given the marginal role of Marxist theory in academic and public life today. Back then, however, its dominance was such that both camps in the present STS community can be traced back to different tendencies within Marxism. The first of the two conjunctures is German idealism and its latter-day exponent, Hegelian Marxism/critical theory.[2] The second is Louis Althusser's scientific or structural Marxism, which made an "epistemological break" with the first tendency. The rejection of dialectics was passed on to his non-Marxist disciples, most notably Michel Foucault. Hostility towards dialectics remained a constant as structuralism morphed into post-structuralism.

The genealogy briefly sketched above allows me to put forward three propositions. First, that the thematic overlaps between the political economy camp and post-structuralist camp in the STS research community, correctly identified by the third-party interlocutors, reflect a shared heritage in German idealism and Hegelian philosophy. Second, that the points of difference between the two schools date back to the "epistemological break" introduced by Althusser. Third, that these differences boil down to mutually exclusive endorsements of either "totality" or "'multiplicity", the former espousing the use of general, explanatory concepts, the latter renouncing the aspiration of grasping Being with concepts. We are thus brought back to the initial question, that is, the contested legitimacy of concepts such as "society" and "capitalism," in studies of science and technology.

Demarcating the Object of Study: Post-structuralist STS

My decision to name one of the camps "post-structuralist STS" is likely to be challenged right away by those to whom I have ascribed this label. Hence, I must start by defending my criteria of demarcation. The problem I face is a recursive one, because the defining trait of "post-structuralism" in all its garden varieties is its principled rejection of the possibility of defining and labelling things. This resonates with the rejection of overarching, explanatory categorisations in social theory. Under this subheading, my focus will be on how post-structuralist STS writers have mobilised their epistemological postulates when responding to critique.

A case in point is the widely read quarrel between, on the one side, Shelia Jasanoff, and on the other Harry Collins and Robert Evans. In their article about the "three waves of STS", Collins and Evans expressed strong reservations about the relativism of what they dubbed "the second wave", which partly overlaps

with what I call "post-structuralist STS". Jasanoff protested that an "artificial boundary" had been drawn around a group of authors—she mentioned Michel Callon and Bruno Latour among others—who are so distinct that no single critique can be addressed to all of them at once (Jasanoff, 2003, p. 391f). This sounds like a complaint about strawman tactics, but that complaint presupposes that boundaries *can* be drawn, albeit with varying degrees of accuracy. The presumption of Jasanoff is that boundaries, because they are artificial, cannot be drawn at all. Only from this principled standpoint is it objectionable that Callon and Latour end up on the same side of a boundary. What Jasanoff does in her reply to Collins and Evans is to reassert the ban in post-structuralist STS on the use of concepts (i.e. artificial boundaries). John Law has spelled out the epistemological grounds for this way of responding to critique. After summarising some common objections to Actor Network Theory (ANT), he replies in the following way:

> I have argued that the approach [ANT] is not a single entity but a multiplicity. I have also argued that it is embedded in case studies. If this is right, then general criticisms or defenses of "the approach" are likely to mistranslate its epistemic and practical import. (Law, 2009a, p. 150)

In the quote above, John Law writes off both critiques *and* defences of ANT in the same breath: the "approach" is not a single, homogenous thing. This symmetry between critics and adherents is contrived, because Law here presupposes the anti-foundationalism of ANT, precisely the question that is in dispute. Like Jasanoff before him, Law asks the critics of ANT to be so specific as to preclude the very possibility of formulating a critique and addressing it to anyone. Indeed, such a unconditional demand for multiplicity dissolves any kind of conceptual position. It is hard to say anything about anything without first having assigned a name to it (i.e. posited a concept) and, in so doing, isolated an entity from the world in which it is embedded (i.e. drawn a boundary). Most scholars pay no heed to such a unconditional demand for multiplicity, but they will be unanimous in condemning the use of strawman tactics, and the first can easily be confused with the second.

When post-structuralist STS writers are not replying to their critics, they too bracket the multiplicity and contingency of Being in order to say something more specific. A case in point is the many labels that post-structucuralist STS writers have come up with in reference to themselves. Jasanoff has suggested "co-production" as a catch-all term for writers who share a common, constructivist sensibility. It is significant that she defines co-production narrowly enough to exclude some writers in the STS research community from membership of the same category. Those who rely on concepts in their analysis, such as "class" and "capital", have disqualified themselves from the co-productionist cohort (Jasanoff, 2004, p. 31). As for John Law, he offers a snapshot definition of ANT as an empirical version of post-structuralism (Law, 2008, p. 634). If the

label "empirical post-structuralism" is acknowledged when the above-mentioned writers refer to themselves, then it must be equally (in)valid when used by one of their critics, like myself.

Whereas the post-structuralist STS writers ask their critics to be ever more meticulous in distinguishing between individual and ever-changing intellectual positions within ANT-and-after, they do not abide by the same standards when they go on the offensive against rival schools of thought.[3] A case in point is the oft repeated objection to "mainstream sociology", which is faulted for its unquestioning dualisms between nature and society, human and machine, global and local, and so on. Sociologists are therefore said to separate themselves from the object of their study in coming up with objective "social facts" or—what amounts to the same thing—with overarching explanatory frameworks. In so doing, they are accused of claiming to occupy a stable and elevated vantage point from which the world can be subjected to critique.

The argument is not without merit. What I object to is only the broad-brush nature of that critique.[4] Sociology as a whole is equated with one of its many tendencies, namely structural-functionalism. A straight line is drawn from August Comte to Émile Durkheim to Talscott Parsons and then on to present-day sociology *tout court* (Latour, 2000; Law, 2008). Exceptions have been made for American pragmatism and ethnomethodology, that is, those traditions within sociology to which post-strucutralist STS writers claim to be the rightful heirs. To the best of my knowledge, no other branch of sociology has been exempted from the charge against sociology-*cum*-structural functionalism, such as, for instance, Weberian sociology or Tourainian social movement studies. Presumably, these branches too are implicated in the post-structuralist critique of dualistic modes of thinking. Furthermore, the same argument is extended from mainstream sociology to Marxism, without any distinction being made between the two, as evidenced by the following quote:

> For instance, sociologists have sometimes imagined that they have the theoretical or methodological key to the universe: witness the more or less grand narratives of Parsons, critical theory, or Althusserian Marxism. (Law and Urry, 2004, p. 391)

John Law has directed the same critique against both sociology and Marxism on several occasions (Law, 2000, p. 18). And yet, is there not a sense of *déjà vu* in the complaints about mainstream sociology's stale methodology, unreflective dependency on the pre-given, and its failure to explain social change in its unfolding? Those were the objections that Marxists and Marx-inspired intellectuals used to level against professional academic sociology, long before STS established itself as a scholarly community (Gouldner, 1973; Swingewood, 1975, p. 187ff.). This line of argument originates in Hegel's dialectics, succinctly encapsulated in the following quote:

> Antitheses such as spirit and matter, soul and body, faith and intellect, freedom and necessity, used to be important [...] The sole interest of Reason is to dispel such rigid antitheses. (Hegel, [1801] 1977, p. 90)

Overcoming the rationalism and dualism of Kant's philosophy was a central preoccupation for the succeeding generation of German idealists, as I will discuss below. This ambition was part of the "rational kernel" that Karl Marx took from Hegel. It is perplexing to read a critique in which Marxism is reproached for its alleged reliance on dualistic thinking, without the word "dialectics" being mentioned. On those rare occasions when post-structuralist STS scholars have referred to the d-word, it has typically been written off in one or two sentences. This is illustrated in two, somewhat lengthier, polemics against Marxism where dialectics is mentioned, authored by two portal figures, Bruno Latour and Sarah Whatmore. Tellingly, their negative remarks about dialectics are not substantiated with textual evidence or quotes, nor are any of Marx's or Hegel's works listed in their bibliographies (Latour, 1993, p. 57; Whatmore, 1999, p. 24). If I have developed these complaints at some length, it is because they go to the crux of the matter.[5] A dialogue between the different camps within STS will only become fruitful on the day that basic standards of scholarly disagreement are upheld.

To recapitulate: when John Law and his co-writers are subjected to criticism, they respond that their individual positions are too heterogeneous to be treated under a single heading (Jasanoff, 2003; Law, 2009a). Concurrently, the same writers have no qualms about rebuking "sociology" and "Marxism" wholesale, without making any distinctions between different tendencies within sociology, within Marxism, nor even between sociology and Marxism. The only distinction that counts is between sociology-Marxism, on the one hand, and post-structuralist STS on the other. This distinction is all-important, because it rests on the latter having overcome dualistic modes of thinking. How ironic that the post-structuralist STS writers got this idea from one of the intellectual traditions they rebuke, that is, German Idealism and its sociological offshoot, Hegelian Marxism.

With their uncompromising polemic against rival schools within the social sciences, the post-structuralist STS writers have unwittingly introduced a new dualism into the world, a dualism between dualistic schools of thought and non-dualistic ones (i.e. their own). As a direct consequence of this split, the post-structuralist camp comes out looking as monolithic and univocal as does the opposing block of sociology-Marxism. A more nuanced (dialectical or, if the reader prefers, hybrid) reading of rival intellectual traditions would have rendered the self-representations of the post-structuralist STS tradition more nuanced too. Such a reading would have revealed the intellectual debts and the communicating vessels that run between academic sociology, Marxism and post-structuralism.[6] I make this last point to suggest that my interlocutors too have something to gain from a confrontational dialogue based on an "agreement to disagree".

First Conjuncture: Hegel and Lukáks

The unofficial genealogies of post-structuralist STS abound. Some candidates include US military Operational Research (Mirowski and Nik-Khah, 2007) and Russian folk tales (Collin, 2011). I do not aspire to paint a comprehensive picture here. It is clear that post-structuralist STS draws on many sources and intellectual traditions, besides the one I am stipulating. My genealogy has merits in so far as it sheds some light on the debate over the contested legitimacy of concepts and critique. What I seek to demonstrate below is that post-structuralism owes an unacknowledged debt to German Idealism/Hegelian Marxism.

To substantiate this claim, I offer for consideration the similarities between John Law's critique of mainstream sociology, briefly outlined above, and Gillian Rose's critique of the same. She suggested that sociology *grosso modo* falls into two camps, one represented by Émile Durkheim, the other by Max Weber. The two founding fathers of sociology strove to secure the autonomy of their discipline from philosophy, which they did by proposing an object of study suitable to the new discipline: "society" or "culture". It was the master key by which the aporias of the old discipline, philosophy, could be unlocked. Hence, both took up their respective arguments where the most advanced philosophical debates of the day, that is to say neo-Kantianism, had left off.

At the time sociology was established, responses to Immanuel Kant had meandered through several generations of interpreters, notably Johann Fichte and Hermann Lotze. They culminated in two schools of neo-Kantianism, the Marburg school and the Heidelberg school. The crystallisation of two schools claiming different aspects of Kant's legacy exacerbated the dualisms implicit in the master's own thinking. Adherents of the Marburg school gave priority to the object over the subject, the finite over the infinite, facts over values, etc., while acolytes of the Heidelberg school seized upon the second part of these dualisms.

It is known that Durkheim was in contact with the French interpreters of the Marburg school, from which he borrowed his emphasis on validity. Likewise, Weber had links to members of the Heidelberg school during his development of an action-oriented metacritique rooted in values. It is on this basis that Gillian Rose traces the dualism in mainstream sociology between, *inter alia*, validity and values. Her argument culminates in an appeal for a sociology that resolves this dualism by building on Hegel's critique of Kant and Fichte (Rose, 2009). This is the programme of Hegelian Marxism, although Rose laments its lack of success.

The philosophical underpinnings of Marx's thinking were downplayed after his death. Theory development was constrained by the need to furnish a nascent workers movement with popularisations, even before Marxism succumbed to Soviet ideology and Cold War politics. The Hegelian concepts at work behind Marx's economic writings were only reconstructed later, starting with György

Lukács' landmark essay *History and Class Consciousness* ([1923] 1972), in which Lukács took aim at what he considered to be the apex of bourgeois ideology: science. His critique did not stop with the natural sciences, but included the scientific pretences of social science, especially those of fellow Marxists. His anticipations were confirmed by the rediscovery in the 1930s of manuscripts written by the young Marx, in which the Hegelian influences were more explicit. Dissidents could now borrow the authority of Marx to challenge the ossified, scientific Marxism wielded by European communist parties. Hegel's name became a codeword for opposition to party discipline and Stalinism (Thompson, [1978] 1995).

The link between Lukács and the forerunners of what became the STS field is direct. Imre Lakatos was Lukács' assistant before he signed up with Karl Popper. It is no wonder then that many have gleaned Hegel's philosophy of history in disguise when reading Lakatos' synthesis of Popper and Kuhn (Dusek, 1998; Fuller, 2002). Furthermore, Lukács was the mentor of Karl Mannheim, and many of his ideas were later recycled under the "sociology of knowledge" brand (Bailey, 1996). Finally, Lukács gave the chief impetus to the original members of the Frankfurt School, whose critique of scientism and rationalism predated the post-structuralist and post-colonial critiques. This sketchy overview goes to show that Lukács has as strong a claim to be a forerunner of the STS community as do Gabriel Tarde or Ludiwik Fleck. The absence of references to Lukács, and to critical theory more generally, begs for an explanation.[7] It is a lacuna that post-structuralist STS shares with French Theory at large (Habjan and Whyte, 2013). Who better to bear witness to this than Foucault:

> Now, obviously, if I had been familiar with the Frankfurt School, if I had been aware of it at the time, I would not have said a number of stupid things that I did say, and I would have avoided many of the detours I made while trying to pursue my own humble path when, meanwhile, avenues had been opened up by the Frankfurt School. It is a strange case of nonpenetration between two very similar types of thinking which is explained, perhaps, by that very similarity. Nothing hides the fact of a problem in common better than two similar ways of approaching it. (Foucault, 1999, pp. 440–441)

Second Conjuncture: Althusser and the Disciples

To explain this case of nonpenetration, we need to look no further than to Foucault's mentor, Louis Althusser. The structuralist Marxist famously disparaged Hegel and dialectics. His target was not the Frankfurt School, but rival Hegelian-inspired Marxist currents closer to home—Jean-Paul Sartre and Henri Lefebvre. To be compelling to his constituency, Althusser needed to draw on the authority of Marx. He famously claimed that there had been an

epistemological break in Marx's own writing, separating an ideological-Hegelian young Marx from a scientific, mature Marx. The latter prefigured Althusser's structural Marxism. The textual evidence for this claim is scant. Rather, the twists and turns in Althusser's writings should be read against the backdrop of the making and breaking of alliances within the French communist party, unreformedly Stalinist at the time.[8] As the party's leading public intellectual, he was charged with the task of discrediting the "ideological" and "humanistic" writings of the young Marx, reclaimed by the dissidents against party discipline and against the Soviet Union (Thompson, [1978] 1995).

Althusser's public commitment to the communist party and to Marx diverges markedly from the politics of his disciples, which might explain why the connection has rarely been noticed. Many among them, after a fleeting involvement in various Maoist and ultra-leftist *groupuscules* in the years immediately following 1968, became champions of anti-totalitarianism which, in the heyday of the Cold War, was a codeword for anti-communism.[9] Underlying this overt difference in politics, however, are deep-seated similarities in thinking. What Althusser passed down to his disciples was the anti-humanist philosophy and its concomitant hostility towards dialectics. Whereas Althusser needed to exempt Marx from the critique of Hegel, the next generation of French philosophers did not labour under such constraints. They could, with greater intellectual consistency, reject both authorities. Hostility towards Hegelian philosophy permeated that intellectual milieu to the point that it became the trademark of "French theory" (d'Hondt, 1968; Descombes, 1980).

The connection between Althusser and Foucault and, in consequence, the current of post-structuralism more generally, have been documented extensively in numerous previous works (Garo, 2011; Kelly, 2013). The task at hand is to trace the same connection to the subfield of post-structuralist STS. In this article I can only offer pointers; it will take a full monograph to properly establish the web of influences.

The bridge between Althusser and Bruno Latour is Michel Serres, who had the scientific Marxist as his supervisor at École Normale Supérieure (Schrift, 2006). Latour, Serres and Althusser all took their cues from the philosopher of science Gaston Bachelard, from whom Althusser borrowed his "epistemological break" (*coupure épistémologique*) between ideology and science. This influence is noted in passing by Bruno Latour in *The Pasteurization of France* (p. 261, n.13, 1988), and the term "epistemological break" is recurrent in his early works (cf. Bowker and Latour, 1987; Latour, 1987). *H*owever, as Latour is notoriously miserly in acknowledging his sources of inspiration, the connection to Althusser has to be inferred from a second order of testimonies. It is telling that the publication of *Laboratory Life* was welcomed by Althusserians at the time as a point-by-point rebuttal of E.P. Thompson's critique of Althusser's epistemology (Wolff, 1981).

As for Michel Callon, he admits in an interview to having started his intellectual career as an Althusserian (Dosse, 1999, p. 9). That this encounter made a lasting impression on Callon's thinking is suggested by his trademark idea, "performativity", which argues that subjects are performed all-the-way-down, an idea that maps neatly onto Althusser's claim that subjects are made through interpellation.[10] The well-known example from *Ideology and Ideological State Apparatuses* is the policeman who shouts "halt" to a pedestrian, and in so doing interpels the subject into being. Although Callon does not credit interpellation as the source behind performativity, the connection has been spelled out by others, for instance, by Judith Butler (1997, p. 24f) and by John Law (2000, p. 14f). The idea of interpellation/performativity relates to the central topic of my article, that is, the contested epistemological status of concepts. With the claim that theories interpel/ perform the world, Callon seeks to undermine the idea that things in the world can be represented (however imperfectly) in concepts (Callon, 1998; Miller, 2002; Fine, 2003).

As John Law cites Althusser extensively, even today, I am spared the task of demonstrating the mark that the scientific Marxist has left on him. This ongoing dialogue with Althusser's works is also attested to in Law's many reservations, one of which is of particular relevance to my argument:

> Michel Foucault and Louis Althusser had something in common other than their radical politics and their semiotic interest in relations: both tended to imagine that the logics of narrative possibilities, discourses, semiotics, come in very large chunks. (Law, 2000, p. 16)

The implication being that post-structuralist STS has liberated itself from the "very large chunks" of narratives to which its forerunners remained attached. This resonates with the rejection of overarching, explanatory frameworks and concepts. Accordingly, Althusser and Foucault can be seen as way-stations in a drawn-out epistemological break that was only fully consummated with ANT. What is it that has been broken with here? It is the core idea of Hegelian philosophy—totality. Althusser preserved this term in his writings but gave it a very different spin, using it to refer to a decentred whole made up of relatively autonomous levels (Althusser and Balibar, 1970, pp. 97–100). This definition begged the question of the point at which the parts moved from relative autonomy to become independent of the whole, that is, effectively disintegrated into a multitude. Althusser gave no answer to the question. He had to guard himself against the implications of "pluralism", a very damning accusation at the time he wrote, because of its connotation with "liberalism" (Jay, 1984, p. 410).

Rather than rejecting totality *tout court,* Althusser distinguished between the "spiritual" or "expressive" totality of Hegel and Hegelian Marxists, and his own version of totality, which he claimed to have been that of the mature Marx. What has been extricated here is the link between totality and history. Althusser's

totality had neither a genetic point of origin nor a teleological point of arrival. It was an "absent cause" that no individual or collective could represent or make sense of (Althusser, 1969, p. 202f; Althusser and Balibar, 1970, p. 17). To his Hegelian Marxist rivals, the possibility of the human subject being able to comprehend totality with the help of concepts, and eventually to embody totality as the subject of history, was the *sine quo non* of ideology critique. It was the precondition for man to consciously make history (Jameson, 2010, pp. 340–341). Althusser reinterpreted "totality" in line with the anti-subjectivist, anti-humanist and anti-historicist tenets of structuralism, thus emptying it in all but name. These tenets were adopted by the ensuing post-structuralist current. In the subfield of post-structuralist STS, the same tenets are upheld under different names. For instance, the symmetry-principle between humans and non-humans is an innovative reframing of anti-humanism.

The Compromise Proposals: ANT-Marxism Synthesis

The first conjuncture in the genealogy of STS was Hegelian Marxism/critical theory. It was supplanted by a second conjuncture, Althusser's scientific Marxism. The shared intellectual heritage between the political economy camp and the post-structuralist camp within the STS research community goes back to the first conjuncture. It unites them behind a critique of the dualistic modes of thinking in neo-Kantian philosophy and its sociological off-shoots. This shared heritage remains largely unrecognised, which might explain why commonalities on substantial matters have been overlooked by the respective camps. The common ground has been intuited by third-party interlocutors, most of who come from environmental studies. Perhaps hoping to settle the dispute over theoretical matters, and thereby to resolve animosities that poison institutional politics and seminar discussions, they propose theoretical syntheses between ANT and Marxism (Castree, 2002; Gareau, 2005; Perkins, 2007; Silva, 2013; Hornborg, 2014). In what follows, I will discuss three of those proposals in a bit more detail, with the aim of teasing out some common features.

Noel Castree has published a widely read and often cited compromise proposal. He starts by expressing his sympathy for Marxism, followed by an acknowledgment of the contributions that ANT, or a version of this theory, has to offer. This points him towards a union between "relational Marxism" and "weak ANT". He believes that such a union would overcome the shortcomings of ANT, especially its lack of political engagement. Marxists, in turn, could learn from ANT to abandon dualistic thinking and to treat agency and power as relational achievements (Castree, 2002, p. 128). His proposal culminates in a call for Marxists to let go of their totalising fantasies, for instance their insistence on "global capital", a notion that, he believes, obscures more than it reveals (Castree, 2002, p. 132).

What he is aiming at in the last remark is the idea of totality. In making this concession to the post-structuralist STS writers, Castree cancels out whatever it was in Marxism/political economy that he hoped to salvage. For, as I have demonstrated above, the unqualified rejection of totality amounts to the same thing as placing a ban on the use of concepts, including the concept "capitalism". If Marxists give up this concept as a guiding light for their practices, then they can hardly call themselves "Marxists" anymore. Conversely, if the weak version of ANT sounds more compelling to Castree than the strong version, this is because it is no longer ANT. The corrosiveness of "strong ANT" that Castree backs away from is a consequence of the core tenet of ANT that he applauds, that is, the absolutist rejection of concepts and dualisms.[11] Castree thus distorts both Marxism and ANT in order for his synthesis to hold.

Alf Hornborg voices strong reservations about Bruno Latour's philosophy, reproaching it for an absence of political engagement. To balance the score, he gives credit to Latour's critique of Cartesian dualisms. Hornborg then suggests that such post-Cartesian insights were missing at the time when Marx wrote (Hornborg, 2014, p. 126), pondering whether this might explain why Marx took the separation between Nature and Society for granted. The unfortunate consequence of this was that technology and objects were immunised against Marx's otherwise blistering critique. His present-day followers are advised to consult Latour in order to discover that even pure objects can be sources of malign agency (Hornborg, 2014, p. 128).

Hornborg's first claim is startling, considering that the philosophical opposition to Descartes' thinking dates back to Giambattista Vico's *Scienza Nuova*, published in 1725, which pioneered the historical method precisely as an alternative to Cartesian rationalism. It laid the foundation for Hegel's philosophy of history and, by extension, Marx's materialist conception of history (Simon, 1981). Hornborg's second claim is no less tenuous. One of the most celebrated chapters in volume one of *Capital*, "Machinery and large industry", is a sustained investigation into how technology and objects enforce labour's subjugation under capital. Followers of Marx come in many stripes, and Hornborg could easily have found examples of Marxists with a scientistic and progressist bent. However, among the followers of Marx are also some who, inspired by that chapter in *Capital*, have singled out machinery, technology and objects for special scrutiny. Indeed, labour process theory is credited by non-Marxist STS scholars as a source for the current interest in the social construction of technology in the STS research community (Asdal *et al.*, 2007).

Besides the familiar complaints about the lack of political commitment in ANT, Brian Gareau laments ANT scholars' summary dismissals of Marxism, while at the same time commending the epistemological innovativeness of ANT. In particular, Gareau welcomes the attention ANT scholars have brought to the materiality of social relations between humans and non-humans. Marxists can learn from them, he says, that actors' roles are not given by nature but are interlinked in socio-

natural activities (Gareau, 2005, p. 133). Perhaps we may dub this interlinked relation "dialectical", but then again, who learned that from whom? And, on the same note, where did the idea come from that social relations are "material"? I am not interested in naming rights. My point is that the Hegelian-philosophical underpinnings of Marxism has to be suppressed for there to be a need for a theoretical synthesis to start with. The same goes for the supposed lack of politics in ANT.

The complementarity of ANT and Marxism lies in the fact that the former is said to have an advanced epistemology while being short on politics, while the latter is up to its knees in politics while lacking an epistemology. To combine the two would be to add politics to epistemology, like water poured into an empty vessel. However, politics and epistemology cannot be treated as if they were discrete entities (cf. Law, 1991). When third-party interlocutors claim that there is a lacuna in the epistemology of Marxism to be filled with flat ontologies, anti-humanism, multiplicity, etc., they fail to see that these notions are loaded with politics. These tenets are irreconcilable as a consequence of the second conjuncture in the genealogy of STS. To say this is to emphasise the importance of being clear about where one's own philosophical tradition overlaps with *and* differs from the interlocutors' tradition.

Totality versus Multiplicity

I postulate that the key difference between Marxist-inspired political economy approaches and post-structuralist STS approaches boils down to their mutually exclusive endorsements of either totality or multiplicity.[12] The notion of totality is key in Hegelian Marxist philosophy. This was succinctly put by Hegel in the preface to the *Phenomenology of the Spirit*: "The true is the whole". Later on, György Lukács declared this concept to be the key insight that distinguished Marxism from atomist, bourgeois thinking (Lukács, [1923] 1972). Conversely, the defining trait of post-structuralism in all its garden varieties is the rejection of totality (Lyotard, 1984, p. 82; cf. Jay, 1984, p. 515).

Part of the attraction of "multiplicity" lies in the fact that it signals openness towards many different perspectives. It has an undogmatic ring to it. There is one perspective, however, which this notion cannot accommodate, namely that of totality. Indeed, rejecting all recourse to totality is the very point of referring to multiplicity. Shifting from the spatial to the temporal realm and forcing the argument a bit, we might say that the same opposition is reproduced between "necessity" and "contingency" (cf. van Houdt, 2011). Necessity and totality are intrinsically linked, because totality implies a necessity in how the parts relate to each other and to the whole. It should be noted that, in the Hegelian Marxist tradition, necessity is not opposed to freedom. Rather, the actualisation of freedom presupposes an acknowledgement of necessity. To post-structuralist STS writers, in contrast, necessity is the polar opposite of freedom, where

freedom is indistinguishable from having "agency". What quells this freedom to act arbitrarily is "technological determinism", "universal truth claims", "social facts" or "overarching structures", all of them being different names for "totality" and "necessity" (Söderberg, 2013). My central claim, then, is that the totality/ necessity pairing is the antithesis of multiplicity/contingency. This way of putting it is deceptively simple, however. In what follows I try to anticipate likely misunderstandings and insert a few caveats to my proposal.

It is predictable that "totality" will be conflated with the way that "system" is understood in structuralist and empirical branches of sociology. In the latter case, social theory postulates a synchronic relationship of a system to its elements. Categories of different orders are nested within each other like containers of different sizes. Such an inquiry proceeds by formulating a hypothesis in a form that could conceivably be falsified by observable data. Totality is something else again, because temporality is its beating heart, resulting in research methods that have more in common with hermeneutics than with statistics (Habermas, 1977). The first version of the whole is synchronic, in other words frozen in time, whereas the second is diachronic, which is to say historical. Whereas functional structuralism is vulnerable to the objection that it has hypostatised a "stable backcloth of facts", this reproach misses the mark when addressed to Hegelian Marxism. It is for this reason that Marxists in the 1970s criticised the stale methodology of academic sociology in terms similar to those of John Law today.

My attempt to summarise the points of difference in the formula "totality versus multiplicity" is also misleading in that it exaggerates the distance between the two camps. Recall that the post-structuralist critique of totality was pioneered by Theodor Adorno, who investigated in *Negative Dialectics* how the particular and material relate to the general and conceptual, giving priority to the former. That being said, Adorno's critique stopped short of a complete ban on concepts and totality (Adorno, 1990, p. 9; for an assessment: Grumely, 1989, p. 183), partly because he did not want to give up on the explanatory and critical power of this position, and partly because he knew that doing so would produce its own aporias and self-contradictions (cf. Eagleton, 1996, p. 10). A different way of putting it is to say that concepts can only be critiqued with the help of concepts. Divisions must be posited as the starting-point for reflection, after which the said dualisms can be nuanced and criticised. If premature victory is declared over concepts and dualisms, they will return by the back door, this time in an unacknowledged and rigid manner (cf. Feenberg, 2000). Hegel put this lucidly:

> Life eternally forms itself by setting up oppositions [...]. What Reason opposes, rather, is just the absolute fixity which the intellect gives to the dichotomy; and it does so all the more if the absolute oppositions themselves originated in Reason. (Hegel [1801] 1977, p. 91)

Adorno, just like post-structuralist scholars today, cautioned against social explanations that draw on an idea of totality. What differentiates them is that the post-structuralists are unconditional in rejecting such explanations. Consequently, and unbeknownst to themselves, they bow to a new totality, this time bearing the names "local", "emergent" or "multiple". This objection was addressed to Lyotard (Jay, 1984), to Michel Foucault (Grumley, 1989, p. 194) and to Michel Serres (Hayles, 1988). Their present-day followers in the subfield of post-structuralist STS are equally vulnerable to this critique.

My formula "totality versus multiplicity" moves across many levels at once: ontology, epistemology, research ethics and politics. To illustrate this, let me restate the opening question of the article: Is the world sufficiently unified and stable over time (ontology) for it to be grasped with concepts (epistemology)? If the answer to the question is "yes", then a hierarchy is established between more and less adequate concepts. This in turn translates into a hierarchy between groups subscribing to concepts of one or the other kind, followed by controversial notions of "vanguards" and "false consciousness" (research ethics, politics). The prospects of changing the world consciously and deliberately hinges on a positive answer to the question above. A negative answer implies that there are innumerable and perpetually changing worlds, with the consequence that the prospect of making Being accord with a concept (of justice, freedom, etc.) must be relinquished. The vanguard-sociologist is deprived of the privileged standpoint from which the world can be explained, criticised and transformed. The world is transformed nevertheless. Actors are now liberated from the will-to-power hidden in the vanguard-sociologists' claim to know the world with his/her concepts.

Whatever answer we give to the question above, we land in a normatively charged position. It is therefore misguided to accuse ANT of lacking politics. It is better to say that the kinds of politics that we may derive from a negative or positive answer to the ontological–epistemological question above are different, indeed, diametrically opposed. It is for this reason, in spite of the caveats listed above, that I maintain: totality and multiplicity are mutually exclusive propositions.

The Hegemony of Multiplicity

Multiplicity is closely related to another philosophical position, namely anti-foundationalism. Both are vexed by the same weakness: anti-foundationalism undermines its own truth claims (Rose, 1979). There is only one kind of intervention that an anti-foundationalist programme can recommend without laying down a new foundation, which is a generalised deconstruction of all foundations or, differently put, of master narratives.[13] This is why John Law has had to defend himself against repeated accusations of quietism. Over the years, he has insisted

that an unflinching stance on multiplicity is an adequate form of political engage-ment (1991, 2009b).

That assertion is put to the test when applied to urgent political matters, whereof there are many examples in the post-structuralist STS literature. Writing about global warming, Anders Blok reminds his readers of the performative powers of social science, in order to suggest that a contributing factor to climate change is the deep-seated dualistic assumptions of social scientists. If those assumptions were abandoned, a different—and presumably more liveable—temperature would result (Blok, 2010, p. 910). Tackling toxic financial products, Fabian Muniesa locates the problem in a naturalistic understanding of the economy, especially prevalent among detractors of neoclassical economics. The remedy is therefore a heightened awareness of the performativity of economic theory (Muniesa, 2014). How come so many good things, from fixing climate change to stabilising financial markets, are expected to follow from the deconstruction of master narratives? The underlying assumption must be that all the ills of the world, or at least all the ills that a social scientist can do something about (without making things worse), stem from erroneous beliefs in totality/neces-sity/master narratives. Stated like this, the proposition sounds highly implausible. Why then is it so compelling to so many?

To answer that question, I must return once more to the French intellectual milieu of the 1970s. At the time, opposition to the metaphysical ideas of necessity and totality was not meant to be a panacea for every conceivable societal ill, from global warming to economic crisis. These additional causes were added at a later date, perhaps in a bid to stay relevant in the face of ever-changing contem-porary problems and funding opportunities. Originally, the argument took aim at one particular ill, although one deemed to be of an importance that trumped all others. That was the threat of totalitarianism. This leads me back to the second conjuncture in the genealogy of post-structuralist STS, that is, Althusser. It was disproportionately his former disciples who became the champions of anti-Totalitarianism.

The anti-Totalitarianism debate in France should be seen against the backdrop of Cold War geopolitics and national election politics. A socialist president was on the verge of being voted into power, and his loyalty to the West was in doubt (Christofferson, 2004). These concerns were wedded to the century-old hostility in France towards dialectics, said to impose a metaphysical closure on Being (cf. Garo, 2011). Intellectuals were urged to side with the fragmented, the hetero-geneous, the local, the multiple and the contingent. Or to put it differently, to relin-quish their pretensions to transcend the present and to make the empirically given conform to reason. Otherwise, intellectuals would set out on the road to Totalitar-ianism (Žižek, 2001). In France, this line of argument grew out of an intellectual milieu wedded to structuralism and anti-humanism. But Hegelianism was linked to totalitarianism in the Anglophone world as well. Karl Popper wrote the liberal, scientist version of the same argument in *The Open Society and its*

Enemies (1962). On the other side of the English Channel, this line of argument could piggyback on a much older tradition of empiricism and scepticism. To cite but one, iconic example, John Locke:

> [. . .] the inventions and creatures of the understanding, made by it for its own use, and concern only signs. [. . .] When therefore we quit particulars, the generals that rest are only creatures of our own making. (Locke [1690] 1999, s.399)

The quote above expresses classic nominalism. It lays down that the source of error stems from the concepts and the generalisations that the fragile human mind summons up to cope with the flow of (chaotic, multiple, contingent and meaningless) sense stimuli. The master concept that the sense stimuli gravitate around is the human being herself, subsequently dissolved by David Hume (1969, p. 257). Cutting-edge French philosophers were receptive to these ideas. For instance, Gilles Deleuze recognised a kindred spirit in Hume's anti-humanism *avant-la-lettre* (1988).

When John Law defines post-structuralist STS or material semiotics as an amalgam of French epistemology and English empiricism (2008, p. 632), he is spot on target. So are the (more uncharitable) commentators who reproach ANT for passing off old-fashioned empiricism-*cum*-scientism as metaphysical chic (Collins and Yearley, 1992, p. 381; Fuller, 2006; Collin, 2011).[14] Arguably, scientism is latent in any social theory that has exorcised the historical subject (along with concepts, the two being intrinsically related). This is part of the legacy of Althusser's scientific Marxism in present-day post-structuralist STS thought. The political load borne by this epistemology should be clear by now. If we grant Locke that concepts, for example "society" and "capitalism", are the mere "inventions and creatures of our own making", then Michel Callon draws the correct conclusion when he says that:

> Capitalism is an invention of anti-capitalists. (Barry and Slater, 2002, p. 297)

Conclusion

I end with a plea for an agreement to disagree. In so doing, I pay tribute to the importance of having pluralism of methods and approaches in the social sciences. These must be chosen with an eye to the object of study and the purpose of the intervention. For instance, post-structuralist STS writers dedicated to deconstructing factual claims in the natural sciences are making a laudable contribution, both scholarly and politically. My objection is limited to the hegemonic bid of a handful of post-structuralist STS writers who seek to place a ban on the use of overarching explanatory frameworks also by scholars in other research traditions.

This expansionism is not without precedent. In 1978, E. P. Thompson described the advent of Althusserianism in the British Isles. Some historians closed their eyes and hoped for the Parisian fashion to blow over. Others, intimidated by the high-flying theoretical language, borrowed a few poorly digested terms from Althusser's disciples. E. P. Thompson warned that Althusserianism, in one form or another, had come to stay ([1978] 1995, p. 3), and the enduring appeal of ANT-styled theories can be taken as a vindication of his hunch. The situation with the English historians is replayed when ANT expands into new research fields, notably environmental studies. Primarily oriented towards empirical research with an outspoken, activist agenda, the "natives" in this field are ill prepared for dogfights over epistemology with the newcomers. Instead we get proposal upon proposal for a theoretical synthesis. Perhaps they hope that, having made concessions on theory and terminology, they will be allowed to go back to influencing environmental policies. Alas, there is no "going back" from the deconstruction of dualisms, concepts and master narratives. This is the legacy of Althusser's "theoretical practice", according to which the proletarian cause was not advanced through political struggle as conventionally understood, but through the endless purification of ideological generalities into scientific ones.[15]

The wish to reach a truce by proposing a theoretical synthesis between the political economy camp and the post-structuralist camp of STS must be resisted. It would bring the debate to a premature close, obfuscating what is most needed for a fruitful exchange of ideas to take place: clarity about commonalities *and* differences between the respective traditions. By reconstructing the genealogy of STS, I have located the commonalities in a shared heritage from Hegelian Marxism, and the differences in Althusser's epistemological break. What separates the two camps can be summed up in the following formula: mutually exclusive endorsements of either totality or multiplicity. This is illustrated by their opposing stances on the legitimacy of using overarching, explanatory categories, such as "capitalism". An agreement to disagree requires one more thing, namely that the basic rules of scholarly engagement are respected: that we are specific about whom our critique is addressed to, that we strive to correctly represent the adversary's point of view, and that we are somewhat familiar with the intellectual tradition that we set out to criticise. Only then can a fruitful dialogue between the two camps commence.

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Notes

[1] In calling this the "political economy" camp, I want it to be loose enough to include STS scholars who occasionally talk about "capitalism" without referring to themselves as "Marxists", or use the term "society" without being a card-carrying member of one or another sociological school. To put it differently, in this camp I include everyone who, in contradistinction to scholars in the post-structuralist STS camp, are not on principle opposed to using overarching, explanatory categories (cf. Birch and Tyfield, 2013).

[2] Adrian Wilding has argued that among the protagonists of German Idealism, Bruno Latour's philosophy has more affinities with Schelling than with Hegel (Wilding, 2010). I find his case compelling, but this qualification is not decisive for the argument that I am making here.

[3] So as not to make the same error myself, that is, making a strawman of my post-structuralist interlocutors, I focus on the works of a single writer, John Law. When need be, I extend my discussion to his co-writers and close associates. Many other writers could have served as the figurehead of this camp within STS. The advantage of choosing John Law is, firstly, that he has been highly consistent in his thinking over the years, still today employing the same terminology that he helped to introduce more than 30 years ago; and secondly, that he stands out in his willingness also to reflect on and discuss the difficulties of his own theoretical position (2009b). I commend Law for his intellectual honesty, but it also makes him an easier target than if I had singled out one of his many colleagues.

[4] The reader is entitled to ask whether sociologists and Marxists are not also guilty of making sweeping statements about rival schools of thought. The problem is more pressing for post-structuralist STS writers, however, because they claim to be able to register Being in its multiplicity, without the mediation of concepts, overarching frameworks, artificial boundaries, etc. In contrast, Kant's critique of Hume's empiricism is the starting point of (neo-Kantian) sociological theory and Hegelian Marxism.

[5] More than a question of form, one might suspect that insidious debating techniques accurately reflect the teachings of a Machiavellian theory of knowledge. Indeed, Bruno Latour has often been reproached on this score, for instance, by Simon Schaffer (1991) and David Bloor (1999). Tongue in cheek, it can be noted that similar complaints were raised against Latour's forerunners, Althusser (Aarons, 1973) and Foucault (Menant, 1973). Indeed, Émile Durkheim lamented that his writings were deliberately misrepresented by Gabriel Tarde (Durkheim, [1895] 1975, p. 173).

[6] John Law is an exception in that he acknowledges an indebtedness to Marxism: "For here is an important input from Marxist and Marxist-influenced traditions: how to distinguish science from ideology?" (Law, 2008, p. 624). However, what he is referring to in this passage is Althusserianism rather than Marxism, with implications that I will expound upon below. Most of his fellow travellers in the post-structuralist STS camp, notably Bruno Latour, are categorical in rejecting Marxist influences (Latour, 2004; cf. Noys, 2013).

[7] This is not to say that every Marxist source has been passed over in silence in the self-representations of the STS research community. It is commonplace to note that the Edinburgh School took its cues from Marxism. However, this school owes more to an analytical and Wittgensteinian tradition, alien to critical theory. Other Marxist sources that have a recognised place in the family tree of STS is the *Radical Science Journal*, anchored in the social movements of the 1960s and 1970s, and labour process theory, out of which grew human–machine interaction design programs (Asdal *et al.*, 2007). Further back in time, critiques of science were pioneered

by English communists in 1930s, most notably the natural scientist John Desmond Bernal and the poet Christoffer Caudwell (Sheehan, 2007; Werskey, 2007). Even as the activist-cum-Marxist pedigree of STS is being rediscovered by STS scholars, the philosophical underpinnings of the same intellectual tradition remain largely unexplored. The notable exception is of course Andrew Feenberg (Feenberg, 2002; see also: Collin and Pedersen, 2015).

[8]An account of the political factions and alliances that underpin the theoretical positions adopted by Althusser was written by one of his former diciples, Jaques Rancière ([1974] 2011). For a latter-day résumé, see Isabelle Garo (2011).

[9]One such disciple was André Glucksmann, who had his books endorsed by Foucault (cf. Wolin, 2010, p. 342f). Gilles Deleuze expressed strong reservations about the Nouveaux Philosophes, something that might have contributed to the growing chasm between him and Foucault (cf. Deleuze, 1977).

[10]Even the argument that economic theory is performative—which Callon draws on to expose the critics of neoclassical orthodoxy as naive believers in truth and falsehood—can be found in *Reading Capital*:

> What political economy does not see is not a pre-existing object which it could have seen but did not see - but an object which it produced itself in its operation of knowledge and which did not pre-exist it: precisely the production itself, which is identical with the object. (Althusser and Balibar, 1970, p. 24)

[11]How about a qualified, as opposed to an absolutist, rejection of concepts and dualisms? That is, a position where the need for making analytical or heuristic distinctions is grudgingly accepted? Such an outlook would conform to "weak ANT" as construed by Castree. In fact, it is the default position of many social theories, from Max Weber's ideal types to Adorno's negative dialectics. If followers of ANT espoused this intellectual position, then their claim to novelty and their charge against the epistemological naiveté of mainstream sociology and Marxism would vanish into thin air.

[12]The reader might ask what the link is between "totality" and "concepts". It is through concepts that human beings attempt to grasp the totality of a situation. If the post-structuralist STS writers' insistence on multiplicity is granted, then it is not just totality, but the use of concepts *tout court*, that must be relinquished.

[13]The falling-out between John Law and his fellow-traveller, Bruno Latour, is illustrative of this. When the latter urged his colleagues to contribute to the crafting of a comprehensive, common world (Latour, 2010), the former responded in the following way:

> In some measure this is because parts of his recent writing—for instance his Politics of Nature (2004)—engage with 'large scale' debates (in this instance to do with ecology and political theory). This is a response that implies, however, a shift in idiom from specificity and the idea that there are no generalities outside links between such specificities, to a willingness to talk (for instance in this case) of constitutions as more or less general procedures for adjudicating the competing claims of not very stable human and non-human realities. If this kind of intervention is becoming more common then it may be that STS is shifting its intellectual character, or (depending on your point of view) displaying signs that it is starting to lose its soul. My own prejudices lead me to the latter view. (Law, 2008, p. 642; cf. Munk and Abrahamsson, 2012, p. 58)

[14]It might come as a surprise that Althusser is characterised in this way, given that he used "empiricism" as a prejudicial term (paired with "humanism" and "historicism"). Crucially, he defined the empiricist process of knowledge as "abstracting essences from things", that

is, the opposite of how this word is conventionally understood (Althusser and Balibar, 1970, pp. 35–36; cf. Kolakowski, 1971).

[15]E.P. Thompson's call to his colleagues to stand firm on theory has lost none of its pungency for present-day researchers in environmental studies. The need for theory is actualised by the surge of "agnotology", that is, the mobilisation by corporations and think tanks of radicalized epistemological doubt about the possibility of establishing causality in order to defeat environmental regulations and the precautionary principle (Oreskes *et al.*, 2008).

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