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# The Culture of Abstraction

## Alberto Toscano

**Abstract**

Focusing especially on *Science and the Modern World*, this article explores Whitehead's understanding of the social contexts and repercussions of mathematical and scientific abstraction. It investigates his remarks on the need to offset pernicious practices of abstraction in the context of a renewed concern with the link between conceptuality and materiality in social theory. Whitehead's inquiry into the problematic legacy of Galileo and scientific materialism is then contrasted with a different diagnosis of the abstractive maladies of modern society, the one put forward under the Marxist rubric of 'real abstraction'. While both stances allow us to explore the social repercussions of abstractive practices, it is argued that an understanding of the practically abstract character of capitalism permits us to identify the limits of Whitehead's pedagogical wish to reform our culture of abstraction.

**Key words**
■ abstraction ■ capitalism ■ commodity ■ culture ■ exchange ■ Marx ■ mathematics ■ Sohn-Rethel ■ Whitehead • Žižek

But if men cannot live on bread alone, still less can they do so on disinfectants. (A.N. Whitehead, *Science and the Modern World*)

The abstraction of matter, of a law of nature, the abstraction of value, etc., in short *all* scientific (correct, serious, not absurd) abstractions reflect nature more deeply, truly and *completely*. From living perception to abstract thought, and from this to practice – such is the dialectical path of the cognition of truth, of the cognition of objective reality. (V.I. Lenin, *Notebooks on Hegel's Science of Logic*)

THOUGH MAINSTREAM culture still nurtures a certain hostility towards the 'abstract' – an impatience with the supposed excesses of academic hermeticism that was manifest in some of the baser

journalistic responses to the death of Jacques Derrida – it is fair to say that contemporary social theory is marked by a proliferation, or even an over-accumulation, of abstractions. Seemingly heeding the Deleuzean call for a superior empiricism, however, recent conceptual production has sought to circumvent the customary reproaches against abstract thought by promoting concepts that are ever more vital, supple, pliant: flows, rhizomes, the virtual, scapes, the diagram, and so on. We could say that theory too – in a world where bases and superstructures have allegedly been swept away by currents both cultural and financial – has entered its phase of flexible accumulation. Leaving aside for the moment what the motivations behind such trends may be, it appears that the usual reproaches against abstraction have been offset by a constant stress on the materiality and flexibility of new vitalist or dynamic lexicons. In a more or less explicit manner, this has meant rejecting two of the dominant features traditionally ascribed to the activity of abstraction and its products: rigidity and separateness. To put it in more figurative terms, it seems that today's abstractions can no longer afford to be lifeless and detached. Indeed if, according to a certain pragmatist vulgate, theory is to function as a toolbox, then the tools (i.e. concepts) themselves should be open to a constant and contextual modulation. The cold abstractions of yesteryear must be replaced by what we could call *warm abstractions*.

The recent interest in Whitehead beyond the confines of philosophical specialization, to which this issue of *Theory, Culture & Society* testifies, provides an excellent spur to a sustained interrogation of the current standing of abstraction. From a certain angle Whitehead might appear as yet another untapped resource whence to draw concepts worthy of our time, a time that our theoretical common sense depicts as refractory to rationalist and modernist models of abstraction – witness the deprecatory tone in which these days one is likely to hear the adjectives 'Cartesian' or 'disembodied'. Whitehead's process philosophy, perhaps filtered through a Deleuzean lens, would then provide new 'tools' with which to register the mutations of the present and emancipate us further from the dead weight of rigid, anachronistic theories that have lost their powers of cognitive mapping. For a number of reasons, many of which have been forcefully put forward by Isabelle Stengers in her recent volume on Whitehead, such *uses* of Whitehead strike me as ultimately unfaithful to the seriousness (the serious *humour*, Stengers might say) of his endeavour. While I shall touch on some of Stengers's suggestions below, what I think crucial in her overall approach is the sense that Whitehead's thought strives toward a speculative reform or emendation of our very culture of abstraction. I wish to use this expression because I think it identifies a number of elements that are crucial to Whitehead's investigations and to their contemporary relevance. Among them is the idea, especially prominent in *Science and the Modern World*, that a society may be evaluated by the uses to which it puts abstraction. This is undoubtedly linked to Whitehead's insistence on the centrality of pedagogy, as well as to his attempt to navigate the stresses and rifts between

various domains of culture – those conflicts of the faculties which, at determinate junctures, hinder the full flowering of our inventive and aesthetic capabilities. Adventures of ideas, in Whitehead, are always adventures across different domains, and his diagnosis of the 20th century does seem to rest on the pained perception of a kind of barbarism of abstractions, an incapacity for certain abstractions to communicate across disciplinary and intellectual fields, and a concomitant proliferation of separations which, driven by the illegitimate hegemony of certain (scientific) modes of abstraction, threaten 'culture' in the broadest acceptation of the term.

In this article, I explore some of Whitehead's subtle considerations on the culture of abstraction and briefly contrast them with a different diagnosis of the abstractive maladies of modern society, the put one forward under the Marxist rubric of 'real abstraction' (for an expanded treatment of this topic see Toscano, 2008). Marx and numerous thinkers working in his wake are also preoccupied with the link between the epistemological misuses of abstraction and the concrete effects of certain modes of abstraction on the livelihood and prospects of human beings. However, by systematically investigating the manner in which the social forms of capitalism may be understood as 'practically abstract' (Murray 2000a, 2000b), the Marxist elaboration of the idea of abstraction permits us to appreciate the limits of any (voluntaristic or idealist) attempt to transform our practices of abstraction which does not fully grasp their embeddedness in mechanisms of social reproduction and the formidable political, and not merely epistemic, challenges that dislodging them might entail. Making a drastic selection in a rich field of ongoing debate (see Finelli, 2007; Kay 1999; Knafo, 2007; Thomas, 2007), I have chosen to contrast Whitehead's fecund recasting of abstraction with the rather neglected work of the German Marxist Alfred Sohn-Rethel, in particular because of his rare attentiveness to the link between capitalism and philosophical thought. This has meant following Sohn-Rethel in focusing on the issue of exchange rather than abstract labour per se (see the critique of Sohn-Rethel on this issue in Postone, 1993: 177–9). While this results in a very truncated vision of the Marxist debate on abstraction, it does nevertheless bring out with clarity the principal shortcoming of a pedagogical, rather than a political, critique of abstraction: the manner in which it can ignore the resilience of abstractions that are really, practically 'out there', operating in a manner that a merely conceptual therapy leaves unaffected. This is not to say that Whitehead ignores the practical repercussions of epistemological developments, the concrete cultural import of our seemingly most hyperborean forms of thought (hence Stengers's suggestive description of him as an 'involuntary Marxist'), but rather that his response to these matters remains fundamentally ethical, and at times suffers from the weakness that besets any philosophical ethics that stands aloof from the criteria of, and constraints upon, social and political transformation.

## 1. In the Shadow of Misplaced Concreteness

Let me begin with a disclaimer: since my focus here is on Whitehead's possible contribution to a reflection on the contemporary uses of abstraction, I shall concentrate on the diagnostic rather than the programmatic aspects of his approach. Were we to look at the latter, our attention would necessarily turn, among other things, to the challenging theoretical proposals that take the name of abstractive sets (in *Concept of Nature*), organic mechanism (in *Science and the Modern World*), and the extensive continuum (in *Process and Reality*). As it stands, I will only concern myself with Whitehead's views about the predicament of abstraction in modern society, views which – though they constitute the motivational background of the more speculative works – are principally set out in the initial chapters of *Science and the Modern World*.

As a mathematician first and foremost (Norman, 1963), it is not surprising that Whitehead repeatedly reaffirms his basic respect for the activity of abstraction and its centrality to thought. Indeed, mathematics – whose originality, according to Whitehead's relational perspective, derives from its capacity to manifest unobvious connections – figures at first as a blessed separation from mankind's worldly entanglements. The 'primal scene' of mathematics, as it were, is that event whereby, in a 'remarkable feat of abstraction', humans become capable of comparing sets of three objects and sets of five objects with utter disregard for their tangible or phenomenological qualities. This is something that, to use one of Stengers's favourite verbs, Whitehead will not cease to *celebrate*, even risking somewhat 'esoteric' turns of phrase, for instance when he defines mathematics as: 'a divine madness of the human spirit, a refuge from the goading urgency of contingent happenings' (Whitehead, 1967: 20). It is in mathematics, and perhaps in mathematics alone, that abstraction is truly sovereign, though its sovereignty is precisely of the kind that does not implicate it in illegitimate forms of reduction and domination. No injustice, it seems, is involved in the mathematician's indifference to particularity:

> The point of mathematics is that in it we have always got rid of the particular instance, and even of any particular sorts of entities. So that, for example, no mathematical truths apply merely to fish, or merely to stones, or merely to colours. So long as you are dealing with pure mathematics, you are in the realm of complete and absolute abstraction. (Whitehead, 1967: 34)

Things become far more interesting (and interest*ed*, we might add) once we consider the articulation of mathematics with other practices of abstraction – scientific, theoretical, industrial. What fascinates Whitehead, in his anti-dogmatic history of the birth of modern science, is the concurrence of a brutal, 'anaesthetic' empiricism, on the one hand, and an ever more forbidding apparatus of abstraction, on the other. Contrary to received wisdom, Whitehead curiously depicts the medieval scholastics as *more* concerned with reason than the progenitors of the scientific outlook. Indeed, he portrays

the Galilean moment, in evocatively political terms, as a *revolt against reason*, or at least as a protest against the autonomy of reason that underpinned scholastic speculations:

> Galileo keeps harping on how things happen, whereas his adversaries had a complete theory as to why things happen. . . . It is a great mistake to conceive this historical revolt as an appeal to reason. On the contrary, it was through and through an anti-intellectualist movement. It was the return to the contemplation of brute fact; and it was based on a recoil from the inflexible rationality of mediaeval thought. (Whitehead, 1967: 8)

In a rather contorted dialectic, the peak of rational abstraction – the 'divine madness' that is mathematics – serves the nascent modern science as a weapon against medieval intellectualism, an intellectualism which, marred by its pathological concern with classification (Whitehead even speaks of 'the rationalistic orgy of the Middle Ages'), languished in a 'half-way house between the immediate concreteness of the individual thing and the complete abstraction of mathematical notions' (Whitehead, 1967: 28). This is not to suggest the presence of a clean break, since the Galilean revolt incorporated, despite itself, the 'inexpugnable belief that every detailed occurrence can be correlated with its antecedents in a perfectly definite manner, exemplifying general principles' (Whitehead, 1967: 12) – together with the *tragic* mindset that contemplates not just 'brute fact', but 'the solemnity of the remorseless working of things' (Whitehead, 1967: 10).

In this uncanny crucible of different strains of thought (mathematical delirium, anti-intellectual empiricism, deductive rationalism, tragic *amor fati*) Whitehead nevertheless recognizes the specific contribution of the Galilean moment, which we could envisage in terms of the passage from abstraction as a (mathematical or theological) *separation from matter* (De Libera, 1999: 33) to abstraction as the *isolation of material systems*. In Galileo, we behold the formulation of 'the concept of an ideally isolated system'; not a solipsistic system, but one that 'is isolated as within the universe' such that it is formally endowed with 'freedom from causal contingent dependence upon detailed items within the rest of the universe': 'this freedom from causal dependence is required only in respect to certain abstract characteristics which attach to the isolated system, and not in respect to the system in its full concreteness' (Whitehead, 1967: 46). In other words, the Galilean abstraction remains a relative or conditional one. In Stengers's terms, it is, as an *experimental* abstraction, one that implies its own *risks* and cannot be subjected to a blanket critique of the representational metaphysics of abstraction:

> [Galileo's] abstraction expresses an event and not a general procedure: the local, conditional, and selective triumph over scepticism. It was rather the mediaeval notion of speed that was abstract in the general sense, separable from the moving bodies it qualified. . . . The speed of Galilean bodies . . . is inseparable from the moving bodies it defines by the existence of an experi-

mental apparatus, which permits one to hold, faced with the concrete multi-
tude of rival propositions, that this speed is not merely one way among others
of defining the behaviour of this body. Abstraction is not the product of an
'abstract way of seeing things'. It has nothing psychological or methodological
about it. It is relative to the invention of an experimental practice that
distinguishes it from one fiction among others while 'creating' a fact that
singularizes one class of phenomena among others. (Stengers, 2000: 86; see
also Latour, 1999: 49–51)

Returning to Whitehead's own diagnosis, the crucial shift in the culture of
abstraction stems from the illegitimate generalization of the Galilean model.
To be more precise, Whitehead latches onto the profound cognitive and
civilizational effects of the 'scientific materialism' that springs from the
experimental union of mathematical abstraction and brute facticity. Our
culture as a whole is determined by the paradoxical realization that (to quote
a phrase that would not be out of the place in the *Grundrisse*) 'the utmost
abstractions are the true weapons with which to control our thought of
concrete fact' (Whitehead, 1967: 32). Whitehead even goes so far as to
remark that it is the 'union of passionate interest in the detailed facts with
equal devotion to abstract generalisation which forms the novelty in our
present society' (Whitehead, 1967: 3). Below, I will touch on how an analysis
of abstraction as an intrinsic component of capitalism might affect White-
head's vision of abstraction as the guiding trait of contemporary society.
What kind of 'weapon' is abstraction when it is regarded not just as the
touchstone of modern science but as a motor of capital accumulation?

  Now, the diagnosis of *Science and the Modern World* rests on the idea
– which the concept of 'real abstraction' will allow us to problematize – that
the scientific materialism born of the Galileo-event is formative of a funda-
mentally *nihilistic* 'general climate of opinion' grounded in the last instance
in 'the fixed scientific cosmology which presupposes the ultimate fact of an
irreducible brute matter, or material, spread throughout space in a flux of
configurations. In itself such a material is senseless, valueless, purposeless'
(Whitehead, 1967: 17). What Whitehead will elaborate as the 'Ionian
fallacy' or 'fallacy of misplaced concreteness' is therefore not to be treated
simply as an epistemological error, but as a harmful, illegitimate kind of
abstraction that infects the entirety of cultural life. This fallacy rests on the
*misuse* of mathematical abstraction. It is due to the facility of the mathe-
matical mind for manipulating abstractions, and the 'enormous success of
the scientific abstractions, yielding on the one hand *matter* with its *simple
location* in space and time, on the other hand *mind*, perceiving, suffering,
reasoning, but not interfering' (Whitehead, 1967: 55). Once philosophical
theory and culture are led to transform the *conditional* isolation of systems
proper to the Galilean apparatus into a *generalized* reductive ontology of
'senseless' matter, concreteness itself, according to Whitehead, is under
grave threat. Incidentally, we should note that though Whitehead admits to
sharing Bergson's protestations against the 'simple location of instantaneous

material configurations', he does not think that spatialization is a kind of original sin of the intellect. Rather, he argues that 'it is the expression of more concrete facts under the guise of very abstract logical constructions. There is an error; but it is merely the accidental error of mistaking the abstract for the concrete. It is an example of what I will call the "Fallacy of Misplaced Concreteness". This fallacy is the occasion of great confusion in philosophy' (Whitehead, 1967: 50).

So what is to be done with abstraction? According to Whitehead, we cannot simply pick and choose superior metaphysical schemata (he mordantly dismisses this as 'juggling with abstractions'). But neither may we seek refuge in familiar facts and deny the formidable powers of abstraction. As he writes: 'Thought is abstract; and the intolerant use of abstractions is the major vice of the intellect. This vice is not wholly corrected by the recurrence to concrete experience' (Whitehead, 1967: 18). Far from being a partisan of a return to immediacy, or even to some primordial dimension of process, Whitehead is here voicing his estimation of the relative hegemony of the mode of abstraction (scientific materialism) instigated by the Galileo-event. The success of the latter, not just in attaining scientific results but in mobilizing an entire culture (in politics, aesthetics, economics, etc.), means that the call to experience per se does not suffice. What is required is a rational evaluation of modes of abstraction in their standing vis-à-vis experience. Whitehead is more than aware that in order to arrive at experience we need to engage in a subtle but comprehensive work of constructing abstractions. Having said that, there is a kind of empirico-cosmological *Urdoxa* (Deleuze and Guattari, 1994: 210), beyond induction, to which Whitehead returns when he seeks to weigh the relative merits of different modes of abstraction. He discusses this in terms of 'faith in reason':

> Faith in reason is the trust that the ultimate natures of things lie together in a harmony which excludes mere arbitrariness. . . . This faith cannot be justified by any inductive generalisation. It springs from direct inspection of the nature of things as disclosed in our own immediate present experience. There is no parting from your own shadow. (Whitehead, 1967: 18)

Induction will always remain prisoner to misplaced concreteness, to 'simplified editions of immediate matters of fact' (Whitehead, 1967: 18), unless we find a way – by means of a speculative system capable of circumventing the fallacies inherited from Galilean materialism – to attain 'full concreteness' and 'the right understanding of the immediate occasion of knowledge' (Whitehead, 1967: 44).

As Isabelle Stengers has elegantly shown, it is by reconstructing the manner in which the concreteness of overlapping events and durations is 'abstracted into' the spatio-temporal schemata of scientific materialism that Whitehead affirms his own superior empiricism (Stengers, 2002: 192–3; Whitehead, 1971). In texts such as *Concept of Nature*, we can follow Whitehead as he excavates the pre-spatial and pre-temporal manifold wherefrom,

by a process of selection and isolation, are generated the basic abstractions of the scientific mindset and the common sense that follows in its wake – abstractions such as the non-extended instant. At times, it even seems that Whitehead is engaging in a Nietzschean critique of the deadening, abstractive imposition of language. For instance, he writes: 'Thus language habitually sets before the mind a misleading abstract of the indefinite complexity of the fact of sense-awareness' (Whitehead, 1971: 108). But, as Stengers is quick to remind us, to set an empiricist complexity *against* the mortifying force of language and knowledge would be simply to reinscribe, in an anti-intellectual vein, the bifurcation of nature. Abstraction must rather be reconceived as internal to the concept of nature, immanent to the construction of experience: 'Knowledge or words do not create abstraction, they require abstraction, which constitutes the character discerned' (Stengers, 2002: 95). To quote a famous example of Whitehead:

> Amidst the structure of events which form the medium within which the daily life of Londoners is passed we know how to identify a certain stream of events which maintain permanence of character, namely the character of being the situations of Cleopatra's Needle. Day by day and hour by hour we can find a certain chunk in the transitory life of nature and of that chunk we say, 'There is Cleopatra's Needle'. If we define the needle in a sufficiently abstract manner we can say that it never changes. (Whitehead, 1971: 167)

Abstractions such as Cleopatra's needle are thus not to be condemned, but rather understood as the necessary *achievements* they represent – whether in the domain of everyday experience and perception, or in that of experimental practice. In Stengers's reading, which turns Whitehead's thinking in the direction of an 'ecology of abstractions' (Stengers, 2002: 165), there is a recognition of the necessity of abstraction (for adjudicating permanence, for instance), as well as an attempt to think the impurities and entanglements that lie behind the apparently purifying character of abstractions themselves. Weighing up the 'explanation' of our gustatory experience of vanilla through the isolation and manipulation of the vanillin molecule, Stengers, following the line of thought laid out in works such as *Cosmopolitiques*, indicates that such an activity of abstraction is anything but 'innocent'; it implies a whole set of risks, wagers and the construction – itself woven from abstractions – of novel modes of detection. In such cases, we are in the presence of 'technical, economic and intellectual ingredients . . . which make "important" a mode of abstraction independent of the percipient event' (Stengers, 2002: 121). In short, abstractions are never simply *explanans*, but above all *explananda*. Whitehead's very conception of philosophical activity is grounded on this 'subordinate' character of abstraction:

> The explanatory purpose of philosophy is often misunderstood. Its business is to explain the emergence of the more abstract things from the more concrete things. It is a complete mistake to ask how concrete particular

> fact can be built up out of universals. The answer is, 'In no way'. The true philosophic question is, How can concrete fact exhibit entities abstract from itself and yet participated in by its own nature? In other words, philosophy is explanatory of abstraction, and not of concreteness. (Whitehead, 1978: 20)

Moreover, Whitehead's own concept of nature is designed to be capacious enough to account for the abstractive practices at the heart of both everyday experience and scientific experimentation. In Stengers's terms, Whitehead 'asks that nature, that of which we have experience, be conceived as capable of providing the mind with what is required by the possibility of abstraction, what is required by the indefinite set of abstractions which are already required when we recognise a horse' (Stengers, 2002: 99). In other words, it is not a question of declaiming the axioms or categories that would incontrovertibly found nature, but of providing the means to think the risky emergence of abstractions, abstractions which are thus not to be envisaged in terms of a kind of sovereign legislative authority, an authority which, in Stengers's view, is vitiated by its 'indifference towards the risk of failure' (Stengers, 2002: 121). It is the unconditional abstraction of scientific materialism, then, which Whitehead and Stengers are attempting to offset through a speculative attentiveness to the localized and risky emergence of abstractions.

In accordance with a line of thought that Stengers develops in the sixth volume of *Cosmopolitiques*, this emergence is neither imposition nor induction, but rather the result of an interaction (or an encounter) and a response. This is how she puts it in her discussion of the relation between abstraction and Whitehead's theory of objects:

> As for the ingression of the object, its first function is to affirm that abstraction, required by the judgment of recognition, memory and comparison, is not reducible to intellectual operations: regarding what is abstract we must say both that we abstract it and that, in so doing, we respond to an offering whose respondent is nature. (Stengers, 2002: 127)

It is to the extent that they do *not* respond to such an offering, or simply 'select out' or disqualify wide swathes of experience, that reified abstractions (and principally the ones that peddle 'misplaced concreteness') become the target of Whitehead's critical examination, which, wary of 'clearcut trenchant intellects, immovably encased in a hard shell of abstractions' (Whitehead, 1967: 59), seeks to shine a light on those important areas of experience that their selective machinery might exclude. It is at this point that, once again pleading against the 'intolerance' of abstractive thought, Whitehead sets out most clearly what he sees as the task of theory in general and philosophy in particular – the task of a discipline which, rather than merely policing the legitimate use of abstractions, should be permanently vigilant as to their tyrannical ossification:

> You cannot think without abstractions; accordingly, it is of the utmost import-
> ance to be vigilant in critically revising your *modes* of abstraction. It is here
> that philosophy finds its niche as essential to the healthy progress of society.
> It is the critic of abstractions. A civilisation which cannot burst through its
> current abstractions is doomed to sterility after a very limited period of
> progress. An active school of philosophy is quite as important for the loco-
> motion of ideas as is an active school of railway engineers for the locomotion
> of fuel. (Whitehead, 1967: 59)

This last sentence, setting out the ideal of philosophy and of theory as a
kind of *civil service*, is testimony to Whitehead's understanding of abstrac-
tion as a matter of culture and, indeed, of cultivation.

In this light, Whitehead does acquire the lineaments of the cultural
critic, one who sees in the success of scientific materialism the temporary
triumph of a 'one-eyed reason' (Whitehead, 1967: 51). But the theorist as
critic, as the above quotation elucidates, is also first and foremost an
engineer, who, instead of delegitimating the present or clamouring for its
collapse, labours in the production of 'progressive' and aesthetically
inclusive modes of thought. This role for theory is nevertheless based, as I
have suggested, on a firm conviction regarding the possibility of reforming
our habits of mind and dislodging the obstacles they might pose to social
progress. The philosopher has a role as an engineer of ideas and the
abstractive fallacies whereof Whitehead speaks are contingent results of the
adventures of ideas, not written deep into the structure of the intellect (as
in Bergson) nor (as we shall see below) woven into the very dynamism of
contemporary society. This is in many respects a compelling and relevant
vision of the function of philosophical or theoretical activity. But, even if we
accept this vision of the philosopher as a critic, or better a reformer of
abstractions, what obstacles or aporias might lie in its way? In order to
answer this question, in the next section I consider a stance, born out of
Marx but periodically revised by different authors (Toscano, 2008), which
also strives to produce a critique of abstractions, but which regards such
criticism as eminently practical and political, since it finds the sources of
'bad' abstraction not in the ossification of the modes of thought bequeathed
to us by scientific materialism, but in the dominant forms of capitalist
society itself. From such a standpoint, Whitehead may appear to overesti-
mate the *reformability*, in the absence of systematic social transformation,
of our dominant abstractions. In the conclusion, I will return to Whitehead's
attempt 'to resist always and forever the power of abstraction' (Stengers,
2002: 221) in light of the Marxist concept of real abstraction, and assess
how both might speak to our current wrestling with the culture of
abstraction.

## 2.  Thought before Thought: Alfred Sohn-Rethel and Real Abstraction

Whether we consider the analyses of commodity fetishism, the formalization of surplus value, the investigation of abstract labour or the discourse on alienation, it is difficult to ignore that much of the force of the Marxian theoretical matrix is founded on its depiction of capitalism as the culture of abstraction *par excellence*, as a society that is *really* driven, in multiple and often unexpected ways, by *actual* abstractions (Lukács, 1972; Murray, 2000a, 2000b; Osborne, 2004; Postone, 1993). A particular modality of social abstraction can thus be identified as the *differentia specifica* of capitalism vis-à-vis other modes of production. As the Italian Marxist phenomenologist Enzo Paci wrote, in a book where he also tried to bring Whitehead and Marx into dialogue:

> The fundamental character of capitalism . . . is revealed in the tendency to make abstract categories live as though they were concrete. Categories become subjects, or rather, even persons, though we must here speak of *person* in the Latin sense, that is, of masks. . . . 'Capitalist' means a man transformed into a mask, into the *person* of capital: in him acts capital producing capital. . . . The abstract, in capitalist society, *functions concretely*. (Paci, 1979: 160–1, 153; emphasis in original)

The debate around Marx's own concept of abstraction has often taken its cue from one the few methodological pronouncements bequeathed by the author of *Capital*, the famous 1857 Introduction to the *Critique of Political Economy* (Marx, 1970). Specifically, it has orbited around the interpretation of a famous passage on the dialectics of the abstract and the concrete (Ilyenkov, 1982) whose core is the following:

> The seventeenth-century economists, for example, always took as their starting point the living organism, the population, the nation, the State, several States, etc., but analysis led them always in the end to the discovery of a few decisive abstract, general relations, such as division of labour, money, and value. When these separate factors were more or less clearly deduced and established, economic systems were evolved which from simple concepts, such as labour, division of labour, demand, exchange-value, advanced to categories like State, international exchange and world market. The latter is obviously the correct scientific method. The concrete concept is concrete because it is a synthesis of many definitions, thus representing the unity of diverse aspects. It appears therefore in reasoning as a summing-up, a result, and not as the starting point, although it is the real point of origin, and thus also the point of origin of perception and imagination. (Marx, 1970: 206)

Several commentators have argued that in these pages Marx promotes a theoretical break with an empiricist or neo-positivist usage of the terms 'abstract' and 'concrete' to signal a distinction between sensibility, perception, and sense data, on the one hand, and speculative form or theoretical

concept, on the other (Bensussan, 1999: 4–7; for a dissenting opinion, see Echeverría, 1989). Or rather, Marx reformulates the distinction such that the sensible and the empirical appear as a final *achievement*, rather than a presupposition-less starting-point (Virno, 2001). Consequently, Marx's theoretical stance on abstraction, as intimated in the 1857 Introduction, cannot easily be mapped onto customary distinctions between empiricism and rationalism, or even, one might argue, materialism and idealism (this is in part why a confrontation with Whitehead can be fruitful, inasmuch as the latter's thinking too is not easily circumscribed by the traditional schemata of abstraction). This is also evident in the 'twisted' genesis of Marx's concept of abstraction, which begins with a Feuerbachian critique of Hegel, moves through a Hegelian surpassing of Feuerbach and finally results in a political and theoretical incorporation and overcoming of the very terms of Hegel's *logic* of abstraction.

Inasmuch as Marx produces a methodological conception of abstraction which is diagonal to Feuerbachian sensualism and Hegelian logicism, different authors have concurred in seeing the 1857 Introduction as a break with a humanist or anthropological concept of abstraction and the passage to something like a notion of *real abstraction* – abstraction not as a mere mask, fantasy or diversion, but as operative in the world (Finelli, 1987, 2007; Rancière, 1989). Marx's crucial theoretical revolution would then lie in passing from a fundamentally intellectualist notion of abstraction – which projects liberation as a 'recovery' of the presupposed genus (putting Man where God, qua distorted humanity, once stood) – to a view of abstraction which, rather than seeing it as a structure of illusion, recognizes it as a social, historical and 'transindividual' phenomenon. Among the most influential readings of Marx as such an anti-humanist theorist of abstraction is of course that of Althusser, who sought to rearticulate and refine Marx's methodology with his theory of 'generalities' in order to produce a materialist theory of thought (Althusser, 1996; Toscano, 2008).

But did Althusser do justice to the theoretical revolution that many have discerned in Marx's 1857 Introduction? Revisiting a groundbreaking albeit little known work on real abstraction – Alfred Sohn-Rethel's *Intellectual and Manual Labour* (1978) and Slavoj Žižek, in *The Sublime Object of Ideology* (1989), replied in the negative. Despite the affirmation of the reality of theoretical practice and of the work of theory, and the attempt to rescue a concept of the real from any vulgar empiricism, Althusser, Žižek contends, was not able really to grasp the uniqueness of Marx's vision of the relation between thought and capitalism – which is why, while he was able to think of a real that is also abstract in the guise of theoretical practice, he could not actually accept the category of 'real abstraction'. As Žižek writes:

> The 'real abstraction' is unthinkable in the frame of the fundamental Althusserian epistemological distinction between the 'real object' and the 'object of knowledge' in so far as it introduces a third element which subverts

the very field of this distinction: the form of the thought previous and external to the thought – in short: the symbolic order. (Žižek, 1989: 19)

Let us pause on this paradoxical, but crucial, formula: 'the form of the thought previous and external to the thought'. What might this mean both within the context of Sohn-Rethel's own account of real abstraction and in terms of a wider reckoning with the role of abstraction in contemporary social theory? And how might this externality of thought affect the vision of the philosopher as a critic and reformer of abstractions suggested by Whitehead?

Sohn-Rethel sets off from a bold wager: to repeat, without succumbing to analogy or resemblance, Marx's critique of political economy in the field of thought; to engage, as the subtitle of his book indicates, in a Marxian 'critique of epistemology'. This critique is founded on the discovery of an 'identity between the formal elements of the social synthesis and the formal components of cognition' (Sohn-Rethel, 1978: 14), an identity that may be registered through the 'formal analysis of the commodity' (Sohn-Rethel, 1978: 33). This analysis is not only able to unlock the (open) secrets of capital accumulation, but to reveal their relation to the division between manual and intellectual labour. What Sohn-Rethel is effecting is a veritable *expropriation of abstract thought*. Not only are we enjoined to move beyond the ideological habits of empiricism and to consider the social and material reality of cognition – the solidarity between abstraction and capitalism – Sohn-Rethel is arguing (against any scientific autonomy of theoretical practice) that the fundamental structures of abstract thought (as manifest in the structure of scientific laws, the postulations of mathematics or the very armature of the Kantian transcendental subject) are all to be found in the commodity-form and its injection, into the social universe, of the principles of abstract exchange and calculability. In Žižek's apt summary: 'Before thought could arrive at pure *abstraction*, the abstraction was already at work in the social effectivity of the market' (Žižek, 1989: 17; for a critique of this focus on the market, as opposed to the centrality of abstract labour, see Postone, 1993, and Murray, 2000a). Though both perspectives, broadly speaking, address the processual preconditions for the emergence of the notions of abstraction and equivalence characteristic of modern science, theory and economics, the social (meta-)history of the transcendental put forward from this Marxist perspective poses a noteworthy challenge to the largely internalist treatment of abstraction formulated by Whitehead in *Science and the Modern World* and other texts.

Take the way in which Sohn-Rethel outlines the break between Marx's concept of abstraction and the abstractions of theoretical philosophy:

In order to do justice to Marx's *Critique of Political Economy* the commodity or value abstraction revealed in his analysis must be viewed as a *real abstraction* resulting from spatio-temporal activity. Understood in this way, Marx's discovery stands in irreconcilable contradiction to the entire tradition of

> theoretical philosophy and this contradiction must be brought into the open by *critical confrontation* of the two conflicting standpoints; this is the contradiction between the real abstraction in Marx and the thought abstraction in the theory of knowledge. (Sohn-Rethel, 1978: 21)

The reason for this irreconcilable contradiction is that for Marx, to put it bluntly, *abstraction precedes thought*. More precisely, it is the social activity of abstraction that plays the pivotal role in the analysis of real abstraction. Here is the 'thought previous to and external to the thought'. It lies in the prosaic activity of commodity exchange and its grounding in practically abstract labour, and not (in both the logical and historical sense) in the individual mind of the doer. In a manner that might elicit comparison with Whitehead (Halewood, 2005a, 2005b), abstraction is primarily to be thought of as the effect of a spatio-temporal action or process (though Whitehead's own radicality, of course, lies in questioning the abstractions of space and time themselves).

Sohn-Rethel will thus argue that it is 'the action of exchange, and the action alone, that is abstract' (Sohn-Rethel, 1978: 26). Both intellectualism and theoreticism are left behind by a position which declares that abstraction is produced by the fundamental social nexus of capitalist society:

> The essence of the commodity abstraction, however, is that it is not thought-induced; it does not originate in men's minds but in their actions. And yet this does not give 'abstraction' a merely metaphysical meaning. It is abstraction in its precise, literal sense . . . complete absence of quality, a differentiation purely by quantity and by applicability to every kind of commodity and service which can occur on the market. (Sohn-Rethel, 1978: 20)

It is Marx's notion of a social *form* – a notion incommensurable with the *eidos*, *morphe* and *Begriff* of the tradition, as well as with any kind of form *extracted* from experience by an act of cognition – which, according to Sohn-Rethel, holds the key to Marx's theoretical revolution, inasmuch as it heralds 'an abstraction other than that of thought' (Sohn-Rethel, 1978: 102).

Moreover, this concept of real abstraction can be used to account for specific historical transformations within epistemology and its practical applications, for instance, the passage, testified to within the history of architectural engineering, from Egyptian rope-measurement to Greek geometry, on which Sohn-Rethel writes:

> In order, however, to detach it from such application a pure form of abstraction had to emerge and be admitted into reflective thought. We reason that this could result only through the generalisation intrinsic in the monetary commensuration of commodity values promoted by coinage. (Sohn-Rethel, 1978: 102)

This link between technology and abstraction, though socially mediated in Sohn-Rethel, was also a concern for Whitehead, who was adamant that the

peculiar practices of abstraction that have become synonymous with modern science (e.g. in relativity theory) could only be articulated once their very possibility was technically possible (e.g. in the Michelson-Morley experiment). The Marxist tradition appears here as in a sense the *less* technologically determinist, inasmuch as it regards forms of technological framing and equivalence as themselves predicated on practically abstract labour and exchange. A reactivation of Whiteheadian intuitions in social theory should accordingly reflect on the social (or economic) deficit, as it were, in his otherwise captivating chronicle of abstractive thought.

To summarize, Marx's intuitions regarding real abstraction allow us to confront some crucial social realities of capitalism to which classical philosophy and much social theory are simply blind – for instance 'abstract things', such as *money*, and 'abstract men', such as *bourgeois property owners* (Sohn-Rethel, 1978: 19). As Paolo Virno puts it: 'A thought becoming a *thing*: here is what real abstraction is' (Virno, 2004: 64). Sohn-Rethel's point is perhaps even more radical, both more dialectical and more materialist: a real abstraction is also a relation, or even a thing, which *then* becomes a thought. In all these instances, we do well to heed the lesson that Žižek draws from his chiasmic reading of the Freudian theory of dream-work and the Marxian analysis of the commodity: 'the "secret" to be unveiled through analysis is not the content hidden by the form (the form of commodities, the form of dreams) but, on the contrary, *the "secret" of this form itself*' (Žižek, 1989: 11, emphasis in original). In other words, the secret of real abstraction is precisely *an open secret*, to be gleaned from the operations of capitalism themselves, rather than from an ideological preoccupation with a true concreteness or hidden essence that the abstractions of capital may be deemed to conceal.

## 3.  Conclusion: Cultivation or Critique?

Any appraisal of contemporary capitalist society cannot do without an investigation into the effective, productive, material – in brief, *real* – character of abstraction. In this respect, Whitehead's numerous attempts at formulating theories of abstraction not beholden to the intellectualist limitations of traditional philosophy, as well as his focus on the philosopher's practical vocation as a critic of abstractions, are precious elements in a reconsideration of the current standing of the culture of abstraction. And yet, though Whitehead excels in the speculative capture of the reality and materiality of abstraction, even in his diagnoses of the inhibiting or prejudicial character of certain habits of abstraction he seems unconcerned with the entanglement of scientific and intellectual abstractions in *social* ontology (in this specific respect the claim that Whitehead's ontology is social 'all the way down' fails to persuade). This trait of his thinking, which is hardly unique, makes his attempt to cultivate a 'new mentality' (Whitehead, 1967: 2) and a new aesthetic of abstraction at times appear voluntaristic, as well as exceedingly optimistic about its chances of implementation under hostile conditions.

When Whitehead writes that – under the rule of the scientific (and industrial) materialism he sought to counter – nature 'is a dull affair, soundless, scentless, colourless; merely the hurrying of material, endlessly, meaninglessly' (Whitehead, 1967: 54), he does not seem to anticipate what would become the lesson of Sohn-Rethel, to wit that such quantitative equivalence is the result of the fetishized relations of exchange among men – irrespective of their intentions and 'prior to' the development of the kind of experimental and measuring devices that we attach to such events of abstraction as the work of Galileo (see also Finelli, 2007). Or rather, though Whitehead recognizes the solidarity between the modern economy, industry and scientific abstraction, he seems to locate the responsibility for this state of affairs in a ubiquitous mentality, rather than in 'the thought external to and prior to the thought', i.e. in the abstractions intrinsic to our social existence. It is instructive in this respect to register Whitehead's oscillation between, on the one hand, the promotion of a new ecology of abstraction, in which theorists and philosophers might play a significant role (a proposal that could bring him into fruitful contact with Gilbert Simondon's musings on technical culture, Gabriel Tarde's ideas on expertise or even Adorno's remarks on 'culture and administration'), and, on the other, a somewhat Weberian sense of the impersonal advance of abstraction, and of the kind of aesthetic and experiential nihilism that accompanies it. This is clear, for instance, when, discussing the baleful trend to 'professionalization', he writes: 'The world is now faced with a self-evolving system, which it cannot stop' (Whitehead, 1967: 232).

In her *Penser avec Whitehead*, Stengers has noted that Whitehead might be seen as a kind of involuntary Marxist, 'insofar as the domination of abstraction is what capitalism presupposes and effectuates in the process of commoditization, when every concrete production is reduced to its exchange value in a regime of generalized equivalence and when the living labour of men is evaluated as "labour power"'. However, she dismisses such an affinity to the extent that, for Whitehead, 'an intolerant abstraction cannot be attacked with another intolerant abstraction' (Stengers, 2002: 159). In light of Sohn-Rethel's pioneering work, it could be argued that such a claim, as well as Whitehead's own symptomatic oscillation between elitist voluntarism and Weberian pessimism, disavows precisely the *reality* of abstraction in capitalism. To call the critique of political economy intolerant is to evade, without refuting it, its claim that rigid, intolerant and lifeless abstractions are woven into the fabric of our social relations, and not merely a matter of historically sedimented mentalities, or narrow ecological attitudes. It is also to evade the Marxist contention that no amount of cultivation of new, more tolerant, more inclusive abstractions will ever be capable of replacing not just the critique, but the actual disactivation or subversion of the abstractions that actually frame and govern our social existence. Of course, this problem of cultivation and critique, and of theory's role as a producer and monitor of abstractions, becomes all the more urgent in a situation of 'cognitive capitalism', when abstractions themselves become the

object of investment and speculation, and when procedures and meta-procedures in turn become commodities (Cillario, 1990: 165–73). This also affects the tensions within contemporary social theory, which is at once wary of abstraction – to the extent that the latter seems to perpetrate a crime against the complexity of a social world – and proliferates abstractions to account for, describe and 'perform' a world in which the 'material' primacy of information (or immateriality *tout court*) makes abstraction crucial to any understanding of our social being.

The question that enduringly preoccupied Whitehead was 'that of abstraction, and more precisely of the lack of resistance characteristic of the modern epoch towards the intolerant hardness of abstractions which declare as frivolous, insignificant or sentimental everything that escapes them' (Whitehead, 1967: 158). We cannot be faithful today to his call for a revision of our modes of abstraction without investigating the role of real abstractions, abstractions which, rather than mere sports of the history of ideas, are woven into the very actions (of labour, exchange and valuation) that produce and reproduce contemporary society. Especially in an era of cognitive capitalism we cannot afford, as Whitehead sometimes did, to think that the disasters of 'progress' are to be chalked up to bad habits of abstraction and to the generalization of scientific materialism. In such an era, unless the sources of such real abstraction are examined and undermined, the kind of pedagogical reforms and emendations of abstraction suggested by Whitehead will remain powerless. Whitehead's denunciations – in *Science and the Modern World* – of immoderate industrialism, professional-ization, and the truncation of human capacity and inventiveness for the sake of a supposed 'rationalization', can only gain in force and specificity from the kind of critique of real abstractions initiated by Marx and furthered by Sohn-Rethel and others. What is certain is that both Whitehead's work and the Marxist interrogation of real abstraction are indispensable points of reference for any reflection on the role of abstraction in contemporary social theory. Together, they might allow us to seize the true roots of abstraction in social practice, and, vice versa, to understand the myriad ways in which social life itself is practically abstract.

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