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DANIEL ANDLER

## IS NATURALISM THE UNSURPASSABLE PHILOSOPHY FOR THE SCIENCES OF MAN IN THE 21<sup>ST</sup> CENTURY?

Jean-Paul Sartre famously wrote, nearly 50 years ago, that Marxism “remains the philosophy of our time. We cannot go beyond it.” In his critic Raymond Aron’s words, Marxism was for Sartre the “insurpassable [or, in other translations: unsurpassable] philosophy of our time.”<sup>1</sup> Taken in context, Sartre’s pronouncement was at once descriptive and prescriptive: it was, according to him, neither objectively possible for the philosopher to leave the confines of Marxism, nor ethically permissible to attempt to do so.

This ‘thick’ or hybrid modality was characteristic of dialectical materialism: the eventual overthrow of capitalism, the dictatorship of the proletariat, the subsequent disappearance of the state, these were stages which were at once inevitable, and the proper aims of political action at successive moments of the historical process. Dialectical materialism was at once a theory of the historical and social process, an overarching perspective, a methodology for arriving at the truth regarding these matters, and finally a practical (ethical and political) norm. The underlying necessity was material, not metaphysical: ideas were thought to be the necessary byproduct of objective economic conditions, in particular of the production relations and the accompanying class struggle. One mechanism which was supposed to underlay or implement this necessitation was a principle of ideological reflection:<sup>2</sup> dialectical materialism, as a theory or perspective, a train of thought, was thought to be secreted by the economic set-up, becoming the ideology of the proletariat, thus motivating its members to undertake the revolutionary activities which would eventually lead to the overthrow of capitalism, etc. Indeed, Sartre’s quote above is truncated: “[Marxism] remains [...] the philosophy of our time *because we have not gone beyond the circumstances which engendered it.*”<sup>3</sup>

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1 The French word is “indépassable”.

2 The label is one which I am coining for present purposes. I am not a Marxian scholar and as will be immediately obvious my goal in this paper has nothing to do with political philosophy or history. In particular, although I am aware of the distance between Marx himself and later forms of Marxism such as dialectical materialism, and of differences between various forms, ‘vulgar’ and otherwise, of Marx-inspired thought, I have no use here for such distinctions. Interested non-specialist readers might like to consult <http://marxmyths.org/>.

3 Jean-Paul Sartre, *Critique de la raison dialectique*, vol. 1: *Questions de méthode*, Paris: Gallimard 1960, p. 29. English translation *Search for a Method*. New York: Alfred Knopf 1963, p. 30. In French: “Il [le marxisme] reste donc la philosophie de notre temps: il est indépassable parce que les circonstances qui l’ont engendré ne sont pas

Thus Sartre, faithful to materialism, recognized at once the inevitability of a certain train of thought at a given moment of human history, and its contingent character: the process of which it was a part would eventually lead to a new situation, in which a different train of thought would become available (and would in fact *inevitably* be taken up, thus presumably becoming the unsurpassable philosophy of the new epoch).

This remembrance of things past motivates this paper's title and its general direction, as I will try to make evident presently. But first I need to make perfectly clear that I do not intend to base a value judgment ~~of~~ naturalism on the parallel I am drawing with Sartre's version of Marxism. It is perfectly obvious that there are continuities between Marxism and contemporary naturalism, but I do not intend to draw them out in this paper. Marxism, especially of the Sartrian sort, is held in low esteem in many quarters nowadays, in particular among a majority of committed naturalists. I am emphatically not suggesting that what (at least until the recent economic events) appeared to most people as history's negative judgment on Marxism has any bearing on contemporary naturalism. In fact, I will be defending a position which falls in the ballpark of 'liberalized' naturalism. One of the differences between my position and stronger or stricter forms of naturalism concerns the modal status of the naturalistic stance, and this is where the parallel with Marxism comes in, merely as a heuristic or expository device.

## 1. NATURALISM: DESCRIPTIVE AND NORMATIVE

What is variously known as scientific or philosophical naturalism in the context of contemporary analytic philosophy appears, at least to our eyes which do not yet have the benefit of hindsight, as one of those bicentennial groundswells which sweep the entire philosophical scene. As many authors have stressed (it has indeed become an *idée reçue*, a ready-made morsel of philosophical conversation), nearly everyone (in the English-speaking world) is a naturalist *of sorts*. It turns out that there are different kinds of naturalism. Some say that different philosophers *mean* different things by naturalism,<sup>4</sup> but I prefer to think that philosophers have different views about the *nature, structure and scope* of naturalism, conceived as a very general stance towards human knowledge and the role played by the natural sciences. In the most general sense, I see naturalism as the recommendation that

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encore dépassées." I am indebted to Thomas Flynn for locating the exact passages in the French original and the English translation. Italics in the text are mine.

4 "It is a commonplace that 'Naturalism means many different things to many different people'." Mario De Caro/David Macarthur (Eds.), *Naturalism in question*. Cambridge, MA: Harvard University Press 2004, Editors' introduction, p. 3. The embedded quotation is from Lawrence Sklar, "Naturalism and the interpretation of theories", in: *Proceedings and Addresses of the American Philosophical Association* 75, 2, 2001, pp. 43-58.

natural science be taken with utmost seriousness. From this as starting point, the routes to more evolved, fleshed-out philosophical positions are many. The two main branches are ontological or metaphysical, whose central tenet is that nothing truly exists but what the natural sciences purport to provide knowledge about; and epistemic or methodological, which take the natural sciences as a paradigm of all knowledge-seeking activity. These branches fork in turn, again and again, and the resulting paths can meet again or remain disjoint. Describing the resulting and ever-changing landscape is not a task which I will undertake here, although I will have to engage in a while in a bit of simple taxonomy.<sup>5</sup> The point here, besides fixing some terminology, is to stress the philosophical nature of the various strains of naturalism thus construed: they are conjectures regarding how certain (abstract) things actually are, research programs aiming at showing them to be this or that way, arguments purporting to provide evidence that they are, etc. In other words, naturalism is seen as an epistemic enterprise.

But seen in another light, as when naturalists are engaging their philosophical opponents, it sometimes looks as if naturalism regards itself as a cause, whose opponents, whether outright antinaturalists or mere skeptics or agnostics, are wrong, not just theoretically wrong, but ethically wrong. Thinkers on both side can sound as if they believed that it is their duty to defend, as the case may be, naturalism or antinaturalism: not merely an intellectual duty, but a moral and a political one as well. The other side is often seen as committing the sin of scientism, or, to the contrary, of antiscientific obscurantism. There is a symmetrical disagreement about which side is truly defending the humanity in mankind: Is it the naturalist who is denying humans their basic dignity by putting them on par with (nonhuman) animals or (biological, naturally evolved) machines? Or is it the antinaturalist who, whether she means it or not, “objectively” (as the Marxist would say) sides with the opponents of progress and the defenders of the established, superstitious or violent order, by preventing the lights of science from shining over the ills of humankind and bring about some cures?

The militant naturalist is also a crusader, one who believes that it will necessarily turn out, in the long run, that the world falls entirely within the scope of the natural sciences, and that those not in his camp, ranging from declared opponents to the uncommitted and weak-kneed, are standing in the way thus retarding the eventual triumph at the cost of unnecessary intellectual toil and human suffering. The militant anti-naturalist in turn sees the naturalist as divesting philosophical energy in a direction which will turn out to be eventually fruitless, and in the meantime as slowing down her attempts to bring out the theoretical, and even the practical conditions of a more humane world.

It might be thought that this militant streak is nothing over and above the normal passion which enlivens the truly important philosophical debates. Granted,

<sup>5</sup> See. e.g., Philip Kitcher, *The Advancement of Science*. New York & Oxford: Oxford University Press 1993; David Papineau, *Philosophical Naturalism*. Oxford : Blackwell 1993; De Caro/Macarthur, *ibid*.

the debate around naturalism is not a unique occurrence of militant excitement in the history of philosophy. But nor is it always the case that a disagreement, however deep, in philosophical orientation is accompanied by such militancy. An example in point, in the philosophy of science, is the issue of realism: the divide is deep, positions are entrenched, yet nobody in either camp believes that, should the opponent prevail, something terrible would happen to science, to philosophy, or to humanity. While, as Steven Horst writes in a recent book, “some naturalists [...] claim, in essence, that the mind *must* be naturalized, or else something unseemly follows”.<sup>6</sup> This is the normative form of naturalism which sometimes (not always of course) shadows the epistemic, philosophically legitimate form of naturalism. Normative naturalism (in this very peculiar sense of the phrase, quite distinct from the various doctrines put forth and illustrated under that label by such authors as Larry Laudan or Joseph Rouse<sup>7</sup>) has a prescriptive and an eschatological dimension, just like dialectical materialism: it will *necessarily* come about, you *must* help it along, or else ...

We are now in a position to understand why the problem of naturalism can be posed on two levels. First, we can ask whether naturalism (in one or another of the available varieties) is true. Second, we can ask whether the question may reasonably be asked, or whether, as some would have us believe, it is the ‘insurpassable philosophy of our time’. This paper does not propose direct answers to either question. Rather, it defends a stance which permits to pursue the first question while taking the second into account. I will plead neither for or against naturalism in its strong form. In particular, as I don’t think that even in its strong form, naturalism is committed to reductionism, I do not feel the need to raise the anti-reductionist flag. Nor do I believe that naturalism is necessarily ‘normative’, although it is an important part of the current dialectical situation that it sometimes is, and thus I certainly don’t think it should be combated as such. It should be discussed on its merits as a philosophical thesis, and as a fruitful metaphysical research program, in Popper’s sense.<sup>8</sup>

There is however a tension which the reader cannot have failed to notice between the claim that nearly everyone today is a naturalist and the description of the epic struggle which naturalists wage against hardened opponents and meek skept-

6 Steven Horst, *Beyond Reduction: Philosophy of Mind and Post-Reductionist Philosophy of Science*, Oxford: Oxford University Press, 2007, p. 15; quoted by D. Gene Witmer, in *Notre Dame Philosophical Reviews*, 2008: <http://ndpr.nd.edu/review.cfm?id=128>. Witmer disputes the aptness of Horst’s characterization, arguing that the norm in question is nothing over and above the perfectly reasonable commitment of the honest scholar to bring her and others’ beliefs in line with what appears as the best available evidence provided by science.

7 Larry Laudan, “Normative Naturalism”, in: *Philosophy of Science* 57, 1990, pp. 44-59; Joseph Rouse, *How Scientific Practices Matter*. Chicago: University of Chicago Press 2002.

8 Karl R. Popper, *Realism and the Aim of Science*. London: Hutchinson, 1983, §23, pp. 89-193.

tics. The tension can be partly relieved by relativizing the near-universal quantification to a subpopulation of philosophers, and concomitantly noticing that the remaining population is far from empty, comprising at least analytic philosophers of a Wittgensteinian bent, and a vast majority of Continental philosophers and social scientists. There *is* a struggle, but at this point in time the naturalists seem to have the upper hand; why this is the case is a question worth asking, and we will get back to it presently. Some considerable tension remains however, and it is borne by an increasingly visible group of ‘liberalized’ naturalists,<sup>9</sup> philosophers who subscribe to the most fundamental inspiration of naturalism, yet see major objections to some of the tenets of the pure sort of scientific naturalism which seems *prima facie*, and often claims to be, the only naturalistic game in town. There is indeed a gnawing suspicion that liberalized naturalism is a more or less subtly disguised form of antinaturalism. The suspicion does not arise only in the critical mind of the ‘card-carrying’ naturalist: it sits at the heart of the liberalized naturalist herself.<sup>10</sup> In what follows, I will present my own form of liberalized naturalism, and try to show that despite its combining insights from both sides, it is a principled position. But I don’t expect to convince the reader that it is a perfectly stable position, not being fully convinced myself.

## 2. CAUGHT IN THE MIDDLE

Here in a nutshell is the predicament. The fact is that right before our eyes naturalism inspires, and receives reciprocal support from fruitful scientific work and interesting philosophical explorations; moreover, there is synergy between the science and the philosophy, which rather comforts the metatheoretical aspect of naturalism, the idea that philosophy and science are, as the expression goes, ‘continuous’. This seems to require the responsible philosopher to be naturalistic *enough*. On the other hand, general arguments in favor of naturalism, and specific proposals, whether broadly philosophical or broadly scientific, are far from entirely successful; some general antinaturalist arguments do seem to cut some ice; and there is at present no sign at all that ongoing naturalistic programs can reach much beyond the area for which they are tailored: the assumption that they will eventually generalize seems at the present stage quite implausible. Our responsible philosopher must therefore not be *too* naturalistic. Finally, he should not merely steer a middle course, unpalatable to both sides: he should make the antinaturalist side of his position acceptable or at least intelligible to his naturalist friends, and vice-versa, the naturalist side comprehensible to his antinaturalist friends.

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9 Such is the label which De Caro and Macarthur claim for the diverse group of authors in their collection.

10 See the editors’ attempt to justify their attachment to naturalism while reaffirming a rejection of “scientific” or “scientistic” naturalism: *op. cit.*, pp. 13-14.

The fair-minded philosopher must keep firmly in mind the two main features of the dialectical situation. One is that, granting that the assessment just proposed is correct, there is an uneasy stand-off between naturalists and anti-naturalists, with strong arguments on both sides. The second is that even the non-naturalist can sense a dissymmetry in the debate: the initiative is on the side of the naturalists, and to simply discard the evidence and the ongoing scientific and philosophical work on which they base their case would be irresponsible and, yes, somehow wrong. The antinaturalists can't claim that ignoring their evidence and the work in progress on their side would be unreasonable or intellectually unethical *in the same way*, because all or most of it is of a negative nature. Not only are naturalists doing most of the moving on the field, but when they lose control of the ball (as for example when they are subjected to devastating criticism, sometimes from their own ranks) they promptly pick it up: there is a certain self-sustaining robustness in their game which makes their way of playing the right way to play. This is perhaps the sense in which naturalism is indeed the 'unsurpassable philosophy of our time'.

The fair-minded philosopher's task is thus fairly straightforward: to give due credit to the ongoing research programs which are inspired by, or are grist to the mill of scientific naturalism, and yet redress the game so as to block the unsurpassability thesis. It might be objected that the responsible philosopher has a more pressing duty: to arbitrate as best he can between the two sides, and come up with his own considered judgment, issuing in a verdict. But this would be precisely forcing his choice in a way reminiscent of a familiar militant technique. There is a legitimate third way between throwing one's arms in the air and choosing sides, which is to examine the arguments, find them inconclusive and ask not, once again, Who is right, all things considered?, but, What should my stance be, all things considered? The 'minimal naturalism' which I will proceed to defend is my answer to the second question.

Naturalism, I suggested above, in the most general sense, takes the form of a recommendation: *Take natural science with utmost seriousness*. In R. B. Perry's terms, it is "the philosophical generalization of the sciences". But what does this entail? No interesting form of naturalism stops at such general declarations. What makes an avatar of naturalism interesting is the problem situation it proposes<sup>11</sup>. It

11 As Huw Price has recently been arguing (see his "Naturalism without representationalism", in: De Caro/Macarthur, *op. cit.*, pp. 71-88), the very first and most basic choice may well consist in deciding between two possible *targets* of the generalization: should it be the *subject* whose position in the overall scheme of things is to be characterized as that of an inhabitant of nature as science reveals it; or the *objects* which we talk about and represent linguistically which must, as he puts it, *placed* in the natural realm? In Price's own words, subject naturalism asserts that "We humans are natural creatures; human knowledge is itself a natural phenomenon", while object naturalism insists that "whatever exists exists in the natural realms". Although Price makes no mention of it, it seems to me that McDowell's earlier proposal that we conceive of "thinking as the exercise of powers possessed [...] unmysteriously by a thinking being itself, an animal

starts with a certain contrast between a class of *prima facie* “natural” entities, and a class of *prima facie* non-“natural” entities. The first class fixes the reference of “nature” at the start of the game, the second specifies the problem at hand. So for example, the first class might be the set of entities postulated by our best current physical theories, and the second might contain mental states and processes. The corresponding naturalistic stance is expressed, on the ontological plane, by some kind of physicalism about the mental, and on the epistemic plane, by the demand that psychology, or cognitive science, be included in the natural sciences. Or the first class might consist in the ontology of the natural sciences, and the second might be the set of social processes: naturalism in this situation might amount ontologically to the rejection of an autonomous sphere of social entities, and epistemically to the rejection of a bifurcation between the natural and the social sciences. And so forth: the structure of the issue consists in the specification of Class I and Class II, and the claim that Class II is in fact included in Class I. A final condition for a form of naturalism to be worth investigating is that this inclusion relation be non-trivial: it must be moot and require serious scientific and/or philosophical work. Dogmatic assertions of the form “Everything is (or: is at bottom) natural” trivialize the problem and deserve no consideration, no more than such counterparts as “Everything is (or: is in the last analysis) socially constructed.”

I now come to a distinction which is not made explicit, as far as I know, in the literature, perhaps because it is too obvious, perhaps because most philosophers focus on just one side of the distinction, and/or take the other side for granted.

Some forms of naturalism, regardless of their choice of Classes I and II, include a proposed strategy for establishing the inclusion of Class II in Class I. Due to the non-triviality condition, it is not one bit *obvious* that the strategy will work, but the naturalist means to argue that in the fullness of time, every member of class II will be shown, by some clever application of the proposed strategy, to belong to Class I. Programs of this sort are instances of what I call *anchored* naturalism. *Free-floating* naturalism, by contrast, consists in arguments of a general nature purporting to establish, in one fell swoop, the inclusion relation, so that, once the argument is accepted, there is no work left to be done. Although of course there is nothing to prevent a philosopher, or a scientist for that matter, from proposing both specific reductive strategies and general arguments, sometimes in different

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that lives its life in cognitive and practical relations to the world” is a form of subject naturalism. (Quote taken from Hilary Putnam, *Words and Life*. Cambridge, MA: Harvard University Press 1994, pp. 307-8; the reference provided is to McDowell’s Auguste Comte lecture to the LSE of 2 February 1993). See also John McDowell, *Mind and World*. Cambridge, MA: Harvard University Press, 1994, in which McDowell distances himself with what he calls ‘bald naturalism’.

Price’s naturalism is clearly of the ‘liberalized’ sort, and is developed so as to explicitly reject (object, mainstream, contemporary scientific or bald) naturalism. What I discuss in the sequel is object naturalism in Price’s sense; my Class I/Class II problem is what he calls a ‘placement problem’. My own version of liberalized naturalism, to be sketched presently, is (I believe) compatible with Price’s.

writings or at different moments of her itinerary, in fact philosophers tend to fall on one or the other side of the fence. Thus Quine, and those working in the naturalized epistemology tradition, tend to be free-floaters, while Putnam, whether in his former, optimistic mood regarding naturalism, or in his present, pessimistic mood, is interested in anchored naturalism. And he becomes impatient with free-floating naturalism, which he finds “very puzzling”, or a form of outright “I know not what”. Poincaré’s verdict on a related matter is just as final. Poincaré is concerned with the unity of nature: “The question we must ask is not whether nature is one, *but how it is one.*”<sup>12</sup>. In other words, the only question worth asking, if, for example, we are worried about the ‘imponderable fluids’ such as caloric, phlogiston etc., is not, *Can* we reduce or eliminate them?, but rather, *How* do we do it? In other words, what is called for is hard scientific work, genuine scientific imagination, possibly prodded and supported by philosophy, rather than overarching, armchair considerations to the effect that necessarily, some research strategy *or other* will succeed in accomplishing the called-for naturalization.

### 3. METHODOLOGICAL NATURALISM

The following 2-by-2 logical table may be thought to provide a simple, natural way of locating various forms of naturalism:

Epistemology → ↓ Ontology	Yes	No
Yes	<b>1-1</b> (full-blooded naturalism)	<b>1-0</b> (caution, type B)
No	<b>0-1</b> (caution, type A)	<b>0-0</b> (full-blooded anti-naturalism)

**Table 1:** A logical space of attitudes towards naturalism based on ontology and epistemology

Position 1-1 is occupied by full-blooded naturalists, such as a vast majority of contemporary philosophers of mind, who believe both that everything belongs to the natural order and that natural science is the sole means to acquire a true picture of the world. Position 0-0 is occupied by full-blooded anti-naturalists, who believe neither. Position 1-0 in particular by those who are doubly cautious, being willing neither to posit non-natural entities nor to rule out epistemic resources outside natural science (if, for example, they doubt that natural science can provide a full and faithful picture of the world, and they believe or suspect that we do have a grasp, however imperfect, of certain aspects of it, crystallized in common wisdom, practical know-how, non-natural science, literature, etc.). Finally, position 0-1 is defended by another type of cautious philosopher, who sees no reason to deny

<sup>12</sup> Henri Poincaré, *La science et l’hypothèse*, Paris: Flammarion 1902, chap. IX, p. 161; my italics.

the possibility of non-natural entities, but considers natural science to be the only valid way to acquire genuine knowledge.

One clear limitation of this table is that it does not distinguish between two ways of ruling out the ‘No’ answers: positive denial or agnosticism. To decline to be committed to the non-existence of non-natural things, or of non-natural-scientific sources of knowledge, is one thing; to be committed to the existence of non-natural entities, or non-natural-scientific sources of knowledge, quite another. A 3-by-3 table would remedy this shortcoming. But another limitation is that it leaves no room for positions which distinguish between commitment to science and commitment to *natural* science; a 3-by-4 table would be needed to take care of that problem.

The table I propose instead to use in order to locate intermediate positions, including the one I want to defend, is a bit simpler. It is based on a pair of dimensions which are orthogonal to the ones used in Table I. On the horizontal axis figures the contrast class, viz. what ‘natural’ is contrasted with. The basic possibilities are: non-natural equals non-physical or non-material; not accessible by scientific means; and not accessible by the means of the natural sciences. Note that the contrast can be construed either ontologically or epistemically or both. On the vertical axis one finds the two basic stances, or values of commitment towards the naturalist thesis: rejection and acceptance; and in between, a half-way, cautious stance which I label ‘methodological’.

Contrast class: natural vs → ↓ Commitment	Non-physical (non-material)	Not scientifically accessible	Not natural- scientifically accessible
Rejection	Supernaturalism (theological dualism, non-religious spiritualism)	Atheistic pluralism	Scientific dualism (bifurcationism)
Methodological stance	Methodological naturalism, standard sense	Methodological naturalism, my sense (MENA)	Methodological naturalism, Chomsky’s sense, or anti-bifurcationism
Acceptance	Atheological naturalism (anti-supernaturalism)	Broad scientific naturalism	Strict scientific naturalism (physicalism or pluralistic naturalism)

**Table 2:** A logical space of attitudes towards naturalism based on commitment and contrast class

Let us look at the first line. The anti-naturalist may affirm or refuse to rule out either non-material entities (column 1); or entities undetected or unregimented by science *tout court* (column 2); or, more restrictively, by natural science (column

3). The first cell is typically defended by religious believers and by non-religious dualists, who believe in the existence of a spiritual realm separate from the material realm; the second, by philosophers (and lay folks) who believe there are provinces of reality which are out of the reach of science altogether; the third, by philosophers and social scientists who believe there are provinces of reality which are out of the reach of natural science but not inaccessible to all forms of science. Occupants of cell 0-0 in Table 1 straddle the first and second cells of this line, while the occupants of cell 1-0 straddle the second and third.

The third line's three cells, by contrast, need not be occupied by theorists with different beliefs, but by thinkers with different opponents in mind. In the first position, the naturalist insists on rejecting the notion of a non-material realm (either by discrediting the very idea, or by arguing that the purported non-material realm is part of nature after all). In the second position, the target is the pluralist who believes that science leaves out entities or phenomena which belong to the real world. In the third position, the main target is the view of a realm consisting of meaning, norms, values, history, culture which is separated from the natural realm yet is the proper object of study of the sciences of man. This third position is defended by the typical scientific naturalist (the occupant of cell 1-1 in Table 1).

The second line is the one I wish to draw attention to. I have dubbed it "methodological" to indicate its intermediate position on the commitment scale: any doctrine which stops short of committing to naturalism or to anti-naturalism, conceived as clear-cut views based on positive (rather than merely skeptical) arguments, belongs, on my taxonomy, in the methodological group. However, the phrase "methodological naturalism" is used in the literature in at least two different, more restricted senses. What I call the standard sense is the one used in the debate concerning the practice of natural science by Christian believers. It is the stance recommended to someone who is both a believer and a scientist: qua believer, he is a committed supernaturalist, but qua scientist he suspends his belief in the supernatural and conducts his scientific business *as if* only the material world existed. As Michael Martin puts it, "in the context of [scientific] inquiry only natural processes and events exist".<sup>13</sup>

Quite another meaning is given by Chomsky in his recent discussions of naturalism:<sup>14</sup> for him, methodological naturalism is the rejection of 'methodological dualism', the view that human cognitive and (in particular) linguistic processes are subject to a dual description, one provided by the natural sciences, the other by other rational sources. To Chomsky, theoretical understanding of whatever order of phenomena has but one source and takes but one form, whether the topic be the formation of waterfalls, the collision of electrons or the human mind and its vari-

13 "Justifying methodological naturalism" (2002) (available online at [www.infidels.org](http://www.infidels.org)).

14 Chomsky, *New horizons in the study of language and mind*. Cambridge: Cambridge University Press, 2002 and subsequent writings discussed inter alia by Pierre Jacob, "Chomsky's naturalism: its scope and limits", forthcoming (French version in: *Chomsky*, special issue of *Cahiers de l'Herne*, Paris, 2007, pp. 202-214).

ous components. Chomsky's doctrine here is at base nothing particularly new—it is in fact position of the typical occupants of column 1 in Table 1: it constitutes a detailed and updated version of the monist view of the sciences of man, defended and attacked for at least 150 years<sup>15</sup>. But while Chomsky has felt the need, throughout his career, to reassert his stand in the face of what remains (at least on the Continent) a majority view in the human and social sciences, his main concern in his recent writings has been to refute the ontological naturalism which is espoused by the overwhelming majority of his fellow cognitive scientists: unlike them, he defends cell 0-1 in Table 1.<sup>16</sup> The Christian and Chomskyan construals of methodological naturalism occupy the first and third cell respectively of line 2 in Table 2. What will serve as my starting point is the position which occupies the middle cell.

Methodological naturalism, in my sense (which I will abbreviate as MENA), is distinct from the other two varieties inasmuch as it withholds both a negative and a positive final judgment on ontological naturalism. It is radically non-committal in that sense, and also because it takes no stand on the bifurcation thesis: the main opponent here is not the defender of a niche for non-naturalistic human science, but one who denies the legitimacy of a scientific approach to all sorts of (*prima facie* non-natural) things. No great leap of philosophical imagination, MENA in one or another form is constantly re-discovered by philosophers who are either uncomfortable about the majority ontological doctrine in philosophy of mind, or uneasy about the underlying philosophy of science, or unnerved by the unending 'war of methods' in the sciences of man, or (like myself) about all three. I should say right off that I will not end up defending MENA as I am about to present it, but I take it as a first approximation of the position which I will recommend.

MENA is expressed in the following maxim:

*Engage in whatever inquiry, at any given stage of the scientific problem situation, is recommended by scientific naturalism with the aim of securing a positive result, but refrain from any commitment, explicit or implicit, regarding the outcome of the inquiry.*

15 Chomsky is emphatically *not* claiming that natural science is the only source of knowledge concerning mankind: "Someone committed to it [methodological naturalism] can consistently believe (I do) that we learn much more of human interest about how people think and feel and act by reading novels or studying history than from all of naturalistic psychology, and perhaps always will." Noam Chomsky, "Chomsky, Noam", in: Samuel Guttenplan (Ed.), *A Companion to the philosophy of mind*. Oxford: Blackwell, 1994, p. 153. But natural science does have an exclusive responsibility, according to him, in developing a *theoretical understanding* of mind and language. There is no *third way*.

16 My interpretation of Chomsky's ontology might be questioned, but nothing central to the present paper hinges on it; the point here is terminological: methodological naturalism is used by Christians on the one hand, by Chomsky on the other, in different though related senses, and the notion I propose to defend is yet something else, albeit in the same ballpark.

By a ‘positive result’, I mean a demonstration of the fact that some member of the class of prima-facie non-natural entities actually belongs to the other class. Non-commitment means: no assumption made that the naturalistic inquiry about one particular entity or process is bound to succeed, let alone that there exists one strategy, which we are bound to discover eventually, which will work on each member of the non-natural class. Indeed, MENA rejects any commitment to a thesis of the form: everything is really, at bottom, natural, or to any other manifestations of free-floating naturalism. Indeed, in a secondary sense, ‘methodological’ also expresses an implicit demand for a method or family of methods.

Two objections might be raised right away. The first is the well-known precariousness of ‘as if’ positions generally. While, as the example of instrumentalism in the philosophy of science would tend to show, there is no logical inconsistency in defending MENA while rejecting ontological naturalism, there is a threat of pragmatic incoherence in (i) adopting a maxim or strategy or heuristic whose success depends on the existence of certain entities or processes while (ii) invoking ontological abstinence with respect to those entities and processes. My answer is this: MENA encourages piecemeal attempts, on hopeful candidates from Class II, to bring them into Class I, but it does so without postulating universal in-principle success. It even supports a strategy of considering not-hopeful candidates in order to zero-in on what gets in the way. The history of logic provides an example which shows that this can be a good strategy: proving that certain number-theoretic functions are computable (or feasibly computable) is a goal which one can rationally pursue without believing that all functions are computable (or feasibly computable). And failing to show that a function is computable (or feasibly computable) is not necessarily failure tout court; it helps one get the knack, grasp a pattern, and guess whether the case at hand fits the pattern.

The second objection is that despite its apparent opposition to free-floating naturalism, MENA actually comes perilously close to it, due to its non-commitment to any particular naturalization strategy. In combination with its as-if character, this lack of constructive content makes it too bland to be of much theoretical or practical help. MENA needs to be strengthened. I will try and show that an intermediate position with a little more bite can be reached, which is the *minimal naturalism* which I think we should countenance. But first I need to say a few words about the obstacles which, as I see it, block both a brutal upgrading or a brutal downgrading of MENA.

### 3. ON REFORMING RATHER THAN OVERTHROWING MENA

In this section I will limit myself to the naturalization of the mind. There are, as I mentioned at the outset, other entities which one might want to naturalize, and which in fact are being subjected to naturalistic approaches. Most of them

however are connected to, or dependent on the naturalization of the mind and the concepts deployed to that end.

I will begin with two sets of considerations blocking full ontological naturalism, the first from philosophy of science, the second from philosophy of mind. I will move on to arguments against outright rejection of naturalism. The upshot will be that MENA should be reformed, rather than rejected in favor of one or the other position occupying the logical space outlined above. The discussion will performe be highly condensed.

*a. Limits from above, 1: The record of cognitive science*

It is sometimes thought that cognitive science is the eating proof of the naturalistic pie. It contributes in no small measure to making naturalism ‘unsurpassable’. It is said to be ‘naturalizing’ the mind right before our eyes. Thanks to the long-awaited conceptual and instrumental tools which, unlike its predecessors in pre-scientific and scientific psychology, cognitive science finally has secured, it shows every sign of being successful. As we shall see shortly, there is some definite merit to this appraisal, but for now the focus is on its more dubious parts.

One familiar but deep philosophical question bears on how naturalistic cognitive science really is. To what extent has it freed itself, and can it free itself, of its hybrid vocabulary, part intentional psychology plus information processing, part neuroscience plus mathematical-physical modeling? To some philosophers, the lack of a clear-cut answer to this question pretty much closes the case: cognitive science is and is bound to remain a non-natural science. But perhaps they are laboring under too narrow a notion of the natural, just as Locke, before he got “convinced by the judicious Mr Newton’s incomparable book”,<sup>17</sup> was laboring under too narrow a notion of the physical. Rather than pursue this difficult matter, I choose a more pedestrian route.

First, the bare empirical fact is that cognitive science in its present state of development presents a characteristically ‘gappy’ structure. It is most clearly successful for ‘input systems’ (Fodor’s 1983 expression<sup>18</sup>), and at least until recently progress on ‘higher’ or ‘central’ processes was widely regarded as less than impressive. Fodor’s particular way of drawing the contours of the gap is outdated, and there has been, partly as a response to Fodor’s grim assessment, a wealth of interesting work in areas (such as social and moral cognition, emotions, consciousness ...) formerly all but closed to cognitive science. Yet the very abundance of new concepts, paradigms, results, originating in cognitive neuroscience but also at the interface of developmental, cognitive and social psychology, evolutionary biology, anthropology, retroactively proves how deeply ignorant we were all along

<sup>17</sup> Locke, *Reply to Stillingfleet*, 1699, quoted in Roberto Torretti, *The Philosophy of physics*. Cambridge: Cambridge University Press, 1999 p. 75 (full title of Locke’s opusculum in Torretti, p. 478).

<sup>18</sup> Jerry L. Fodor, *The Modularity of Mind*, Cambridge, MA: MIT Press 1983.

about countless functions of the brain/mind. What we are acquiring right now is not only new knowledge in cognitive and brain science, but reasons to suspect that we are still today, as it turns out we were yesterday, more ignorant than knowledgeable.

Second, the general strategy followed by cognitive science since its inception is the one at work in biology in general. It consists in combining a top-down and a bottom-up approach: the first identifies a set of functions and their interrelations; the second identifies the corresponding set of ‘forms’ (material structures or systems) and their causal interconnections. Bottom-up naturalization of the mind is the goal of neuroscience. Top-down naturalization is offered by two distinct research programs: functionalism (the information-processing paradigm, also known as computationalism, classical or otherwise), and evolutionary psychology. Full vindication of ontological naturalism regarding the mind requires a triple success: completion of the top-down analysis; completion of the bottom-up analysis; and, importantly, articulation of the two approaches. In the pioneering stage of cognitive science, this articulation was thought to be provided by an existence proof. The computer was seen as an information-processing, mechanically realized cognitive organ: however defective in its details, the model did show what sense could be made of an articulation of the top-down and bottom-up analyses. That was the whole idea, the grand idea of functionalist neo- or Turing mechanism, articulated by such founders of the field as Newell and Simon, Marr and Fodor.<sup>19</sup>

The hope was that suitable complexification of this paradigm would yield a satisfactory notion of a natural mind. Now while success has been notable, there are conceptual problems, and reasons to doubt that cognitive science is on its way to solving them. It would be futile to try and review here the ever-expanding critique of the classical approach in cognitive science, but it is worth stressing that the key idea of the articulation between the top-down and bottom-up approaches is under attack.<sup>20</sup> Neuro-imagery, evolutionary theorizing, psychology, mathematical/informational simulation, no longer seem to fit together in the way proposed by functionalism, nor is there at present any clear alternative framework. Further,

19 Newell, A. & Simon, H.A. (1976), "Computer science as empirical enquiry: Symbols and search", in: *Comm. Am. Ass. Computing Machinery*, 19, pp. 113-126; repr. in John Haugeland (Ed.), *Mind Design*. Cambridge, MA: MIT Press 1981. David Marr, *Vision: A Computational Investigation into the Human Representation and Processing of Visual Information*, San Francisco: Henry Holt & Company 1982. Jerry L. Fodor, *The Language of Thought*. New York: Thos. Crowell 1975; repr. Cambridge, Mass: Harvard U.P.; Jerry A. Fodor, *Representations: Philosophical Essays on the Foundations of Cognitive Science*. Cambridge, Mass.: MIT Press, 1981.

20 See e.g. Jaegwon Kim, *Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation*. Cambridge, MA: MIT Press, 1998 ; Lawrence A. Shapiro, "Reductionism, Embodiment, and the Generality of Psychology" in: H. Looren de Jong & M. Schouten (Eds.), *The Matter of Mind*. Malden, MA: Blackwell Publishing 2006, pp. 101-120; Denis Mareschal et al., *Neuroconstructivism: How the Brain Constructs Cognition*. New York: Oxford University Press, 2007.

the ‘deep’ faculties (consciousness, intentionality, spontaneity) seem to resist both bottom-up and top-down naturalization, despite the numerous attempts made to this day, and ongoing.

The moral to draw, it would seem, is that the knowledge we have acquired about the mind, considerable as it is, has not reached the level where we can confidently predict the vindication of ontological naturalism about the mind. And following, *inter alia*, Chomsky’s recommendation, the naturalistic spirit itself recommends heeding this consideration.

*b. Limits from above, 2: The argument from context*

Running on roughly parallel tracks with several philosophers of note, such as Charles Travis,<sup>21</sup> but with a different starting point, I have over the years sketched a contextualist, or situated, view of cognition in general, and of rational inquiry in particular. In itself, contextualism appears to raise no insuperable obstacle against naturalism: naturalistic models of context-sensitivity are in fact quite an active area of investigation. However, the way I propose to think about contextuality is as an irreducibly normative dimension of thought, and this, it would seem, does get in the way of all but the most hybrid naturalization programs, programs whose claim to naturalness are extremely dubious.<sup>22</sup>

If there is any merit to my arguments, they seem to imply severe in-principle limitations on the very idea of *prescriptive* natural models of higher cognitive processes, as opposed to *permissive* models. This would by no means spell the end of ongoing efforts to specify such permissive models (which determine the envelope of feasible cognitive acts), but it would very much dull the ontological and ethical teeth of naturalism: who ever doubted that there are natural constraints on what we can think? Of course, as we gain empirical knowledge and conceptual sharpness on these natural constraints, our picture of thought processes can undergo profound revisions. But they will continue, one might well reckon, to contain a non-natural dimension – second nature, culture, spontaneity, history, ...

*c. Limits from below: the record of cognitive science, revisited,  
and the liveliness of philosophical psychology*

Despite its limited success, and despite its shaky foundations, cognitive science is thriving. It is leading philosophy of mind and epistemology (briefly, philosophical psychology) in corners which they hadn’t visited before, despite centuries of hard work. As a result, our views about the mind and its natural underpinnings are undergoing profound changes.

21 Charles Travis, *Occasion-Sensitivity: Selected Essays*. New York: Oxford University Press, 2008.

22 Daniel Andler, “The normativity of context”, in: *Philosophical Studies* 100, 2000, pp. 273-303; Daniel Andler, “Context: the case for a principled epistemic particularism”, in: *Journal of Pragmatics*, 35, 3, 2003, pp. 349-371.

Arguing in favor of such a view is certainly not impossible. But first it is hard to do in a few sentences, and second, it is even more a matter of judgment than of argument. Familiarity with the field, not just its results but its inner processes, its ongoing discussions, its speculative energy, induces a strong impression of a thriving research program. Of course, the same impression was certainly conveyed to optimistic, not to say gullible, witnesses or participants in scientific programs which have since reputedly gone bankrupt, such as Gestalt psychology, behaviorism or classical artificial intelligence. Indeed, as we will see in a minute, this consideration plays a crucial role in the stiffening of my recommendation for an acceptable form of naturalism. Perhaps we should be content at this juncture to record as a fact that a form of philosophical anti-naturalism which would purport to show that what is going on in cognitive science today is essentially a waste of time would meet with considerable scepticism, and that the burden of the proof would rest on the anti-naturalist.<sup>23</sup> He would have to show not simply that some claims are exaggerated, some phenomena likely to remain untouched, some tensions or even contradictions exist between subfields and schools, this or that strategy is bound to fail, etc.: he would have to make a convincing case that a majority of results are either unsound, or uninformative, or again require a complete reinterpretation in order to fit into some kind of conceptually acceptable picture. A tall order. Meanwhile, the realistic spirit again commends rejecting a view which would all but deny coherence and fruitfulness to this scientific and philosophical activity.

But there *is* a negative argument which the anti-naturalist could use, and in fact Hilary Putnam has developed it at length.<sup>24</sup> Putnam, as I said, rightly takes seriously only *anchored* forms of naturalism, and, regarding the mind, he knows of one proposal, based on the functionalist scheme which he himself propounded, and which he has faulted in theoretically deep ways. Putnam seems to conclude, in the absence of a likely stand-in, that ‘computational psychology’, along with associated attempts to ‘naturalize’ the mind, is all but hopeless. I certainly don’t mean to challenge Putnam’s diagnosis of functionalism’s ‘troubles’. But I do want to question what I take to be the logic of his case against cognitive science.

Let me start with a banal consideration from the history of science. We were doing perfectly respectable chemistry before quantum mechanics came on the scene to inform us of what the chemical bond physically consists in. Pre-quantum

23 Mention should be made of two recent collections aiming at casting doubt on the viability of cognitive science: David M. Johnson & Cristina E. Erneling (Eds.), *The Future of the cognitive revolution*. New York: Oxford University Press, 1997; and Cristina E. Erneling. & David M. Johnson (Eds.), *The Mind as a scientific object. Between brain and culture*. New York: Oxford University Press, 2005. They both contain very valuable papers, and I personally sympathize with a number of critical perspectives developed there. I would however not go as far as taking them to be more than just that: critical perspectives, which leave the target alive, though bruised.

24 Hilary Putnam, *Representation and reality*. Cambridge, MA: MIT Press 1988.

chemistry was a naturalistic inquiry into kinds and combinations of stuff, an inquiry legitimate and progressive despite not being endowed with (what we would later regard as proper) naturalistic foundations. This kind of ox-before-the-cart situation is surely not unique. Evolutionary biology is another oft-mentioned case; in fact, it seems closer to being the rule than the exception in the historical development of scientific disciplines. Now, what reasons have we to think that cognitive science is, or should be, any different? What is wrong with the idea that this flurry of activity is progressive and legitimate, despite having as yet no solid foundation? Perhaps Putnam's, and other critics', reasons for thinking it *is* wrong are the following. Cognitive psychology (and thus cognitive science as a whole, insofar as it includes cognitive psychology as a core part), they believe, is *predicated* on the representationalist-computationalist scheme. If that scheme is incoherent, cognitive psychology collapses (or requires at least a complete theoretical overhaul).

Well, this line of argument seems to me perfectly sound when applied to the sort of cognitive psychology associated with such figures as Newell and Simon, and which was barely distinguishable from artificial intelligence. (A lot more would need to be said at this point to do justice to both the program, its critics, and its eventual breakdown, but this would take us too far afield.) But it doesn't apply, at least directly, to cognitive psychology and cognitive science in their contemporary form. The pull towards believing otherwise may be due to over-reliance on *philosophers'* reconstructions of the cognitive enterprise. Inconsistencies or frailties in such reconstructions may be due to the faulty modeling, not to what is modeled, *viz.* the actual science. In fact, I have long argued that a large proportion of the work done under the label of cognitive science happily lives in a no-man's land where no dues are owed to functionalism, or connectionism, or dynamical systems, or methodological solipsism, or externalism, or learning-theoretic or bi-semantic notions of representation, etc. This doesn't mean, of course, that the theoretical bases of the work shouldn't be actively sought by scientists and philosophers. But there is no ground for imputing to it, by default, a provably faulty foundation. The work should be critically examined piecemeal and directly, not through the lenses of a rationalizing philosopher.

#### *d. Upgrading MENA to MINA*

I am now in a position to strengthen my initial proposal for a form of well-tempered naturalism compatible with the constraints discussed up to this point. What MENA lacks is, I suggested, a modicum of anchoring. Yet someone who remains unconvinced by any of the current proposals will be loath to anchor it in a particular naturalistic strategy. How then can I provide my favored form of naturalism with some anchor without anchoring it entirely?

To solve this little riddle, it suffices to go back to AI. What is wrong with MENA is shown by the fact that, at the time, it would not have had the tools, nor the mission, to critically analyze AI (by which I mean 'good old-fashioned arti-

ficial intelligence' or GOFAI, in John Haugeland's terminology<sup>25</sup>): at the time, it seemed that scientific naturalism's best guess as to what line of inquiry to pursue regarding the mind was AI, and so MENA had no choice then but to follow suit. At the same moment, avowed anti-naturalists such as Hubert Dreyfus, and later Haugeland, as well as philosophers such as Robert Cummins and Putnam himself<sup>26</sup> did have the means, and the mission to do it, and did produce a convincing and enlightening critique of AI.

Now of course the cure cannot consist in amending our definition to read:

*Engage in whatever inquiry, at any given stage of the scientific problem situation, is recommended by scientific naturalism with the aim of securing a positive result, except if this inquiry happens to be GOFAI, but refrain from any commitment, explicit or implicit, regarding the outcome of the inquiry.*

Not only would it be useless and unprincipled, but it would also not prevent another possible disaster, the uncritical acceptance of the next fad in cognitive science. For example, even with the proposed amendment, MENA would have nothing to say about the exaggerated claims made on behalf of fMRI-inspired research. Our responsible naturalist cannot be content with letting cognitive neuroscience based primarily on fMRI and other brain-imaging techniques simply take over cognitive science. Minimal naturalism, or MINA, in contrast with mere MENA, is not a laissez (science)-faire attitude. Perhaps one could characterize minimal naturalism as *critical* methodological naturalism. One last constraint might put this demand in sharper focus. What experience seems to suggest is that the mind tempts those that study it, again and again, whether they be philosophers, computer scientists or neuroscientists, to treat the empirical evidence with less than the care it deserves, and altogether disregard large chunks of it. So perhaps minimal naturalism should be phrased thus:

*Engage in whatever inquiry scientific naturalism recommends with the aim of securing a positive result, without foregoing a critical examination of the recommendation, and with due regard to the entire empirical evidence, whether available through commonsense, phenomenology, non-naturalistic or pre-naturalistic science, or again scientific experimentation in the style of natural science. And refrain from any commitment, explicit or implicit, regarding the outcome of the inquiry.*

25 John Haugeland, *Artificial Intelligence: The very idea*. Cambridge, MA: MIT Press 1989.

26 Hubert L. Dreyfus, *What Computers Can't Do*, New York: Harper & Row 1972; augm. edition: *What Computers Still Can't Do*, Cambridge, MA: MIT Press 1993. John Haugeland, 1978. "The nature and plausibility of cognitivism", in: *Behavioral and Brain Sciences*, 1, 1978, pp. 215-226; repr. in John Haugeland (Ed.), *Mind Design*. Cambridge, MA: MIT Press 1981. Robert Cummins, *Meaning and mental representations*. Cambridge, MA: MIT Press 1989. Putnam, *op. cit.* See also the editor's introductory and concluding chapters in Daniel Andler (Ed.), *Introduction aux sciences cognitives*. 2<sup>nd</sup> éd., Paris: Gallimard 2004.

In a nutshell then, minimal naturalism (which is not limited in its application to the study of the mind, though I have used that important special case as a guide) is methodological naturalism with philosophically wide open eyes, a working philosophy based on a close interaction with scientists, one which precludes neither the collaborative production of results, nor criticism and the possibility of renouncing or reorienting the collaboration.

#### 4. MINIMAL NATURALISM IN THE SCIENCES OF MAN

The sciences of man include psychology, of course, and cognitive science can be regarded, very roughly, as psychology pursued by novel means. To that extent, the considerations developed above are ipso facto applicable to the sciences of man. Yet even in this case some interesting issues arise. One might imagine that scientific psychology *is* psychology naturalized, a branch of cognitive science. But although this is not quite false, nor is it quite true. Not only are there branches of psychology which think of themselves as both scientific and distinct from cognitive psychology (social and personality psychology come to mind), but some follow a strictly natural scientific methodology, and some even share their subject matter with cognitive psychology. Why, for example, is there a field called ‘mathematical psychology’, which does intersect with cognitive psychology but has not to this day been absorbed by it, and whose founding fathers are not among the heroes of cognitive science? The reasons could in part be historical, but I believe there are other, deeper, conceptually more significant reasons, having to do precisely with divergences concerning the naturalistic character of the methodologies.<sup>27</sup>

Linguistics presents another case, in which not only can cognitive science claim, as of now, no more than a fraction of the leading research programs, but even those were not until fairly recently uniformly ‘naturalistic’ in the sense in use in cognitive science today. (To dot the -i-s, these branches of linguistics had impeccable natural-scientific credentials without being fully naturalistic at least in some sense: they were stated in a rigorous, formal language allowing for cumulative knowledge and hypothetico-deductive reasoning, yet were not concerned with providing causal explanatory accounts of language, whether proximal or distal). Here again there is some degree of arbitrariness and historical contingency in the cartography of the field, but some conceptual issues are also involved.

The suggestion is that naturalism includes, and sometimes confuses, two independent demands. The first is formal: the theoretical study of an area should

<sup>27</sup> The historical and conceptual origins of the split are intertwined. In fact, the historical record needs to be rectified in order for these connections to come to light. See Gary Hatfield’s revisionary studies in the philosophical history of psychology, e.g. Gary Hatfield, “Remaking the science of the mind. Psychology as natural science”, in : C. Fox/R. Porter/ R. Wokler (Eds.), *Inventing Human Science. Eighteenth-Century Domains*, Berkeley & Los Angeles: University of California Press 1995.

be conducted in ways which are formally in accord with those of (established) natural sciences such as physics, and lead to a body of knowledge whose form is comparable to the knowledge produced by those disciplines. The second is causal and genetic: the theoretical study of an area should aim at bringing to light the causal structure of the phenomena and (in particular) show how they have come into existence.

The second demand can be met without it being clear that the first is as well; hence the debate, now essentially over, about the scientific status of biology. But many areas within the human and social sciences, including cognitive science, can boast a high grade on the second demand and fall exceedingly short of satisfying the first.

The reverse is not only also true, but it raises theoretical issues which appear now to be of central importance. In the words of a contemporary defender “of a thorough and strict naturalism”, Mark Bickhard, “[i]t is distressingly easy to espouse naturalism, but nevertheless to fail in a project of naturalism. [...] Many models fail to be consistent with naturalism in spite of the best intentions of their authors. [...] An essential characteristic of any naturalistic model of any phenomena, therefore, is that it be consistent with the *natural emergence* of those phenomena.”<sup>28</sup> On that count, it now appears as if few among the scientific branches of the human and social sciences are naturalistic.

Indeed, regarding the social sciences proper (sociology, economics, geography, anthropology, demography ...), the quantitative and formal subdisciplines which are not naturalistic (in the second sense) vastly outnumber the naturalistic programs and results. This holds not only under Bickhard’s strong definition of ‘naturalistic’, but even in a less stringent sense, counting as naturalistic an account which provides causal mechanisms, at least in outline, and foregoing the demand for a phylogenetic story (an account of how the phenomena under scrutiny came into being in the first place, after the Big Bang and out of conditions then prevailing).

How are we to make sense then of the existence of natural sciences of man which are not ‘naturalistic’ in a sense acceptable to today’s scientific naturalist? This is a difficult question which cannot be fully explored here. Still, we can make use of our general distinctions. There exist fully naturalistic, partly naturalistic, and anti-naturalistic answers.

The committed, up-to-date naturalist can go one of two ways. The most inclusive goal he might espouse is a full reconciliation of the formal-quantitative and causal-genetic accounts. Such would be the outcome once we find out how certain formal structures and quantitative relations can come into being through the development of increasingly complex systems bound by general laws governing their component mechanisms. This ambitious naturalist wants everything, the

<sup>28</sup> Bickhard, M. H., “Critical Principles: On the Negative Side of Rationality”, in: W. Herfel/C.A. Hooker (Eds.), *Beyond Ruling Reason: Non-formal Approaches to Rationality*. Forthcoming. (My italics).

formal relations and the causal story, and he regards classical cognitive science as an admittedly unfinished yet promising quest for such unification, which will in due course provide the expected articulation, modeled in a very general sense after the Simon-Marr-Fodor scheme of physical realization of formal processes, although possibly at variance with it.

The naturalist might also be less sanguine about the formal dimension, and be more physicalistically or biologically inclined. To her, what really counts are the causal-emergent facts. The formal descriptions might not become available, and if they do they might not play more than an instrumental role. Such would be the inclination of quite a number of cognitive neuroscientists, for example, but more generally, a scientific naturalist of that ilk would hold on to the causal-emergent goal, and renounce the formal goal if it turned out that it were unreachable within the natural-scientific perspective.

The anti-naturalist might accept the formal-quantitative accounts, and even grant them elevated status: he might for example (like most structuralists in Sartre's time) regard those accounts as expressing some invariants produced or necessitated by cultural systems set up by mankind (Levi-Strauss was unique among this group to see the anthropological invariants as a distant reflection of the natural structure of the human mind). On the other hand, the anti-naturalist will refuse to give pride of place to the causal-emergent accounts, which he would see at best as providing limiting conditions on the creative powers of historical humans.

So finally, how should a methodological naturalist, and more particularly, a minimal naturalist, view the situation? First, he would not take for granted the eventual fusion of the domain of formal-quantitative and causal-emergent accounts. Second, he would not take for granted the eventual regimentation of the entire field of human and social science (or of any of its branches) under the formal-quantitative banner. Third, he would no more take for granted the eventual ~~success~~ of the causal-emergent approach. In fact, any of the three possibilities will appear to him as unlikely, in the light of past experience, present achievements, and prospects. Like Otto Neurath,<sup>29</sup> he would call for an 'orchestration' of these different approaches, and with that best-possible outcome in mind, he would support, examine and possibly contribute to whatever research program is recommended by scientific naturalism. This would be his way of recognizing naturalism as today's unsurpassable philosophy for the sciences of man.

Université de Paris-Sorbonne  
Ecole normale supérieure  
Institut universitaire de France  
daniel.andler@paris-sorbonne.fr

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29 Otto Neurath, *Philosophical Papers 1913–1946*. Dordrecht: Reidel 1983.