1 Commentary on *Scientific practice and the scientific image* by Joseph Rouse

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2 In his complex paper Joseph Rouse takes up Sellars' claim that one of the central issues in 20th century philosophy lies in the challenge of recombining the image of the world developed by science, the *scientific image*, with the so-called *manifest image*, in which we appear as personal subjects answerable to norms. Rouse believes, however, that both images must be revised in order to succeed in developing the wished-for stereoscopic vision in a satisfactory naturalistic framework. In particular, and this is the topic of his paper, it is our understanding of the scientific image that must be deeply modified in order to serve this purpose. In this vein Rouse's paper addresses the conference theme, by asking: "How would an emphasis upon science as practice revise the scientific image, in its dual sense of a scientific understanding of the world and a conception of scientific understanding"?[1] Les us stress at once that: 1) according to Rouse (and coherently with his naturalistic stance), the scientific image must include a conception of scientific understanding itself, 2) the practice turn allows revising the scientific image in such a way that it includes a correct *scientific* understanding of scientific understanding itself.

Rouse begins by addressing possible qualms coming from the side of the so-called *dis-unifiers*, i.e. those among the advocates of the practice turn who argue that science should not be seen as producing an image of the world at all. Yet the dis-unifiers, just like Sellars, believe that scientific understanding is based on representation. The dis-unifiers thus conclude, *contra* Sellars, that there is no "scientific image" of the world, in the sense of a single unified scientific representation of it. Rouse points out, instead, that what the practice turn really teaches us is that scientific understanding is not primarily representational, while naturalists themselves have so far tried to naturalize scientific understanding by naturalizing mental or linguistic representations. The outline of Rouse's anti-representationalist account of science can be captured in terms of a series of oppositions between the old philosophical understanding of science and the new understanding issued from the practice turn. **3** According to the old view: 1) scientific understanding consists in

[1] P. 2.

an empirically justified fabric of beliefs, or in a position in an infralinguistic space of reason; 2) scientific understanding is disembodied from social, historical, technological, biological contexts; 3) correlatively, the world, as the objective correlate of scientific knowledge, is endowed with a fix unchangeable structure; 4) scientists strive to reach consensus; 5) scientific understanding expresses itself through retrospective compilations enjoying the consensus of scientists. In contrast, **4** according to the view of scientific understanding based on the study of scientific practices: 1) scientific understanding is essentially *research activity* and, as such, it is incorporated in social, technical, practical, institutional contexts; 2) scientific understanding, along with its practical, interactional, and linguistic performances, is part of a perceptual and practical involvement with the world; 3) the world itself is involved in this interaction and changes in a way that can't be reduced to the mere introduction of material artifacts, because the very structure of what is phenomenally salient, of what the world is for us (*à la* Kuhn), is continuously modified; 4) scientists strive less for the construction of consensus than for making progressive development possible; 5) research is future-oriented: results matter primarily for their being a source of promising future development. [2]

These brief indications should suffice to appreciate what lesson, according to Rouse, naturalists should draw from the practice turn. In other words, Rouse has explained us why naturalism needs the practice turn. Has he also explained if, and why the practice turn needs naturalism, and, in particular, a biologistic variant of naturalism? The second part of the paper indeed addresses this issue, where Rouse tries to argue in what way the notion of scientific image (or scientific understanding) can be improved by situating it in a biological context. This is a crucial point for our discussion, for it concerns precisely the way in which scientific practices are to be analyzed and understood.

5 As we know, Rouse believes that the way in which scientific practices disclose the world, must be understood in scientific terms, and, more specifically, in biological terms. In other words, scientific practices along with science studies must be naturalized. To this one might react that the practice turn is naturalistic from the outset, and that, therefore, no objection should be raised. But is it really true that the practice turn is naturalistic from the outset? What seems fairly uncontroversial is that the practice turn marks a movement away from grand supposedly all-embracing philosophical accounts of science, from first-philosophical reconstructions of science; but this shift can be best captured, as Andrea Woody has done in her paper, as a shift from the *a priori* to the

[2] P. 7. Especially point 4) and 5) are seen by Rouse as discrepancy between the philosophical conception of scientific understanding and the scientists' own understanding of their work. It could be objected that what scientists think of their own field has not been the primary focus of the practice turn. Here, however, Rouse's intention is to show that the philosophical view of science as a shared world-view is not instantiated in science *as research* and that is probably constructed for first-philosophical purposes, and that explains why naturalists should not make the mistake to rely on it.

empirical. It does seem to be a methodological feature shared by most advocates of this trend that what is said about science is supported by empirical evidence; but this empirical evidence is mainly derived from historical, sociological, and ethnological case studies. One can almost claim that the practice turn is analyzable in several components such as a historical turn, a sociological turn, and ethnological turn and so forth, perhaps in as many components as there are social sciences in broad sense of the word. The methodological import of biological or cognitive evidence has been so far rather meager, and it is unlikely to acquire a more prominent role in the foreseeable future. Even most of the items from 1) to 5) characterizing the new understanding of science have been brought about by researches ranging from new experimentalism to historical and social studies of science that one can hardly see as situating science in a biological context. It is therefore doubtful that the actual research activity within science studies needs a biologistic framework in order to gather more evidence about its object.[3] At any rate, one can wonder (and this is my first question), whether biological naturalism has any real *heuristic* value for science studies and case-study-based philosophy of science, in the sense that it can provide otherwise unattainable evidence about science in general and about scientific practices in particular.

However, the value of Rouse's attempt to develop a stereoscopic vision of the world as disclosed by science and of the scientific understanding disclosing it does not rest, I would contend, on the heuristic virtues of naturalism, but on the way it provides a general framework in which the results issued from the practice turn can be combined in a coherent picture, that is in a naturalistic stereoscopic vision. **6** I take this to be Rouse's own idea when he insists on the benefits of the notion of biological niche for a correct understanding of scientific practices: "We gain a richer and more detailed grasp of scientific understanding and scientific practice by recognizing it to be an ongoing process of niche construction."[4]

A biologistic naturalism would thus provide an ontological and conceptual scaffolding for the otherwise largely social science-based understanding of scientific practices. Scientific practices, which are identified by the historian or by the social analyst would thus need to be naturalized, that is reconceptualized in such a way that their being a continuation of our species' niche construction is thematized and fully developed. In particular, Rouse lists five consequences of the introduction of

[3] Let us add, in passing, that a methodological naturalism about social sciences stressing their lack of autonomy with respect to the natural ones will not help in this case. Perhaps there is no specifically historical or sociological understanding to be contrasted with the form of knowledge produced by natural science, but that would hardly imply that the social scientists need notions and methodological framework issued from one or another natural science in order to make advances in their research activity. The job of the historians, for instance, consist mainly in reading documents, and in order to do that they don't need to be reminded at every step that they are members of a given animal species studying the way in which other members of the same species produce some sort of broadly conceived adaptive responses to their environment.

[4] P. 9.

the notion of niche construction for the understanding of scientific practice: 1) seeing new phenomena as the introduction of new patterns into the world that make aspects of the world salient within our way of life. 2) seeing models as implying a shift from representation to interaction for "models are themselves internally structured systems, often ones that produce reliable responses to operations performed upon them." 3) Renewed attention to sciences that studies historical contingency rather than nomological necessities. 4) Elimination of the abyss between nature and normativity. [5] 5) Understanding scientific understanding within the contingency of human history and culture.[6] Hereafter **7**, I will focus on the way in which the concept of niche bears on the notion of world and on the relation between the world and the scientific understanding of it.

Rouse's proposal appears as an impressive naturalistic synthesis of the results of the last three decades of researches on scientific practices. One is entitled to say that Rouse does for the contemporary practice-based account of science nothing less than what Quine did for the representationalist account of science previously developed by the logical empiricists.[7] Quine had replaced more traditional forms of empiricism with a physicalistic-naturalistic account of knowledge centered on the notion of a web of belief in turn interpreted in the light of his behavioristic semantics. For Quine each element of the web of belief is potentially involved in a holistic and never ending process of revision whose constraints, or checkpoints, are imposed by experience, that is by physical events occurring at the speakers' nerves endings. Quine's physicalism consists precisely in accepting the ontology of physics as the guaranty of the objectivity of the constraints imposed upon us by the external world.[8] I suggest that to appreciate the shift from Quine to Rouse's naturalism, one should stress that the latter replaces the notion of ecological niche for the notion of web of belief, while at the same time dropping physicalism. The problem with the concept of web of belief is that it is a naturalistic version of a representational account of scientific understanding (what Rouse defined as an infralinguistic space), whose holistic plasticity is, precisely, the one allowed by the reconfiguration of linguistic items only. In full conformity with the practice turn, the dynamic of scientific understanding is instead viewed by Rouse as a process involving not only the space of reason but material, practical, and social factors too. The holistic entanglement becomes much wider than traditional epistemology had previously foreseen. Scientific research involves readjustments that cannot be reduced to changes to the web of belief,

[5] Normativity is part of what sustains a certain way of life and is itself constantly at issue for that way of life rather than fixed, see p. 11.
[6] End of p. 12.
[7] In spite of the fact that first philosophy was not an issue in the fist place for the advocates of the practice turn.
[8] Elsewhere, Rouse has convincingly argued that Quine's physicalism still presupposed a dualism between theory and empirical content, the former being subject to the indeterminacy of translation and the latter being fixed by the ontology of physics.

for they imply transformations in which the very patters of phenomena that are salient are modified, just as are beliefs, material performances, social institutions, and cognitive values. In this sense, I believe, Rouse's naturalism ends up assimilating the constructivist motives that have been recurrent in recent epistemology, while "urbanizing" them in a naturalistic framework. I am thinking of themes such as incommensurability, world-change, world-multiplicity, and all the insistence on the historically and socially contingent character of scientific research.[9] Indeed, the concept of niche construction includes both the series of elements entering in the previously mentioned dynamics of scientific understanding, all the elements characterizing a certain cognitive form of life, and also the patters of phenomena that become salient within a certain form of life; moreover, a niche is something that is transformed by the species inhabiting it, something that co-evolves with it, as Kuhn already pointed out while drawing what he defined as a *parallel* between biological evolution and the history of science.[10] In sum, that the world itself is at stake in scientific understanding, not just our representation of it is what the notion of ecological niche should capture. In this respect, one should not miss how Rouse defines the concept of niche: "A niche is a configuration of the *world itself* as relevant to an ongoing pattern of activity".[11] The notion of world as existing beyond and independently of the actual forms of life of the various organism, such as the one of the physicalist, is thus rejected by Rouse's naturalism.[12]

8 Several questions could be raised at this point. I limit myself to pointing out that Rouse's definition of niche, as it stands, does not reflect the standard biological use. There are many difference definitions of the concept of ecological niche (some stress the function of a species within an ecological system, others refer to the portion of an environment that a species occupies or to an abstract space characterized by environmental parameters[13]); however, in no way the practice of biology would presuppose anything about the meaningfulness of the notion of world, nor an expression such as "configuration of the *world itself"*. In general, biologists don't make claims about whether the notion of objective world makes sense, nor about whether the environment of an organism admits of an *outside*, what Rouse, coherently with his approach, denies. Rouse here seems to make use of a kind of, extremely philosophical and fascinating Uexküllian view of environment as a world literally existing but *for* a species, as against the notion that there is a single encompassing reality of which different species have different representations. But, biology by itself is not committed to such a heavily ontology-laden notion of niche, even if some biologists do

[9] This does not mean that Professor Rouse is committed to any variant of constructivism, as standardly defined.
[10] See Thomas Kuhn *The Road Since 'Structure'*, (The Univeristy of Chicago Press: Chicago 2000), pp. 101-104.
[11] P. 8.
[12] Unless it be interpreted as an issue for potential new disclosures in the course of the evolution of the scientific understanding of our species, (see footnote 12 at p. 17).
[13] This is the appraoch initiated by G.R. Hutchinson.

venture into this kind of philosophical territory. The notion of niche can (and normally is) seen in a more down-to-earth realistic way, as does Berry Smith, who believes that "In full conformity with the realist perspective, different languages, different theories, and different families of organisms are able to generate their own precisely fitting partitions of one single reality. The various animal behavior-systems generate partitions of reality into their own ecological niches. But these are not separate worlds. Rather, they are partitions of one and the same world, effected for different purposes and at different levels of granularity."[14]

My claim is not that Smith's realistic interpretation of the notion of niche is the only possible one, but that it captures what is really at stake in the research conducted by working ecologists, who, as matter of fact, do not make any claim about the ontological status of reality itself, and stick to a common-sense view of the notions they investigate. In conclusion, and this is my second question **9**, I wonder whether Rouse manages to develop a biologistic-naturalistic stereoscopic vision of the world and of the scientific practices disclosing it, a vision that, as I said earlier, assimilates and reconfigures many constructivist motives brought about by the advocates of the practice turn, only at the price of *deforming* the ontology of evolutionary biology and ecology, in such a way that the rather mundane notion of ecological niche becomes endowed with what looks like a world-constituting role, be it dynamical and contingently structured. The question, in other words, is the following one: is Rouse's understanding of scientific understanding really *scientific*?

[14] Berry Smith, *Toward a Realistic Science of Environments*, ecological psychology 2009, p. 9