

Functions Between Reasons and Causes: On Picturing

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In EPM Sellars exposes severe shortcomings of the classical conception of mental representations as causally given cognitive contents. Since Sellars famously characterizes his criticisms as an attempt “to kill a myth—the Myth of the Given” (§63) and “a general critique of the framework of givenness,” Sellars’ notion of the given and givenness is often identified with the particular variety of givenness that is under attack in EPM, namely, the givenness of the notion of impressions or ideas in modern philosophy. However, elsewhere Sellars affirms that “there is a dimension of givenness (or takenness) that is not in dispute” (FMPP I §87). This dimension of givenness, which ensures that when we change our concepts “we do not change that [in nature] to which we are responding” (ibid.) forms an essential part of Sellars’ own account of intentionality and representation. In EPM this dimension of givenness comes briefly into view when Sellars introduces “psychological nominalism” and explains that

once sensations ... have been purged of epistemic aboutness...the way is clear to recognizing that basic word-world associations hold, for example, between ‘red’ and red *physical objects*, rather than between ‘red’ and a supposed class of private red particulars... [i.e., the ‘ideas’ or ‘sense impressions’ of classical empiricism, and that these “ties” of word-world associations are] *causally* mediated by sensations (EPM §29, p. 161).

Sellars’ basic idea is to replace the classical notion of mental representation with two relations, a field of causal “word-world associations”, which is to account for the ‘aboutness aspect’ of classical representations; and a network of functional relations between sentences, which is to account for the ‘content aspect’. As Sellars elaborates in later writings, the new non-representational approach to linguistic ‘representation’ capitalizes on the double-life of linguistic items as both causal and normative, which

derives from the fact that function needs material embodiment and that norm-governed behavior is reflected in causal uniformities:

Thus, the fact that the underlying uniformities (positive and negative) involved in language-entry, intra-linguistic and language departure transitions of a language are governed by specific ought-to-be statements in its metalinguistic stratum, and these in turn by ought-to-bes and ought-to-dos concerning explanatory coherence, constitutes the Janus-faced character of languagings as belonging to both the causal order and the order of reasons. This way of looking at conceptual activity transposes into more manageable terms traditional problems concerning the place of intentionality in nature. (NAO 130)

While contents as such cannot be caused, contrary to the Cartesian and classical empiricist account of mental representation, material embodiments of functions can nevertheless stand in causal relations. Sellars' notion of 'picturing' denotes, on first approximation, the causal part of this replacement strategy—the relationship that the 'Janus-faced' character of languagings establishes between natural items and natural items embodying the functions that constitute the contents of the observation sentences of a language.

On Sellars' notion of picturing hinges "the dimension of givenness that is not in dispute". Surprisingly, while Sellars' functional analysis of content has been widely discussed and expanded, the notion of picturing has received comparatively little constructive attention.¹ Ignoring Sellars' metaphor of the "Janus-faced character of languagings as belonging to both the causal order and the order of reasons," the 'social-pragmatist movement' focused on the normative domain in the light of reason, leaving the darker causal issues to the purview of neuroscientists or behaviorists. In the following I will suggest that Sellars' account of picturing is worth a closer look if we wish to follow the trajectories of an 'anti-representationalist' philosophy of mind that Sellars draws out in section XV and XVI of EPM.

¹ Early discussions can be found in Margolis 1967 and Bonjour 1973. In June 2005 I presented a precursor of this paper at the *McDowell-Sellars Conference*, arguing for a process-based conception of picturing (see section 5 below). In Spring 2006 Jay Rosenberg sent me a draft of his "Sellarsian Picturing" (published 2007), offering a scholarly exegesis of the relevant parts of SM and MEV together with a reconstructive analysis of the deep systematic points at issue. In reworking my 2005 paper for the EPM-conference in London I benefitted, as always, in many ways from reading Rosenberg's work on the issue.

I will argue exegetical and systematic points. On the one hand, a better understanding of ‘picturing’ will enable us to resolve a number of problems in Sellars interpretation. It can help us to clarify in which way “the dimension of givenness that is not in dispute” does not commit Sellars to a realist stance in any sense of this term that contrasts with a transcendental project. Most importantly perhaps, it can help us to understand why Sellars had good reasons to insist on sensations—though ‘purged from epistemic aboutness’—playing an indispensable role in a philosophical account of perceptual knowledge, i.e., in which sense he retained empiricist intuitions. On the other hand, the notion of picturing has independent systematic interest beyond such exegetical questions. Once we appreciate that picturing is not an abstract relation but a certain type of non-linear causal processing, we can envisage more easily how the tension between the natural and the normative in a Sellarsian philosophy of mind can be addressed in ways that go beyond Sellars’ reliance on the principle that rule-governed behavior is reflected in causal uniformities. As I also shall argue here, the processing that Sellars calls ‘picturing’ can be productively connected to recent work on natural functions, the origins of normativity in nature, and anti-representational accounts of cognition in theoretical biology and cognitive science.

To restate the main objective of this paper from a somewhat different angle, the interpretation of picturing I will offer here puts functions centerstage, as the category that mediates between the domains of causes and reasons by extending over parts of both. In EPM Sellars focuses on the demarcation of the logical space of reasons from the causal order, in order to show that the classical concept of a sense datum is a “mismatching of ideas” (§10) such that the causal and the logical dimension are entangled in ill begotten ways. But the systematic significance of Sellars’ criticism of the classical empiricist’s “crossbreeding of ideas” depends *also* on the

viability of his positive account about the right kind of contact between the causal and the logical or normative, as unfolded especially in his late writings, “Mental Events” (MEV, 1981) and the Carus Lectures (FMPP, 1981). So far the standard reading of Sellars’ conception of the relation between the causal and the normative has focused on the ‘Janus-faced character’ of norm-governed items as emphasized in his writings up until the mid-1970s.² But a Sellarsian account of language and mind can offer more than the mere claim that items in logical space are necessarily causally embodied, or that norm-governed behavior is causally reflected. As I shall suggest here, Sellars has left us enough hints to understand Sellarsian picturing in analogy to an emergent ‘dynamic regime’ in natural systems (such as the formation of hurricanes, biological cells, or the organization of ant hills). Sellarsian picturing is a type of natural, causal functioning that occurs in sensory systems as the emergent ‘dynamic regime’ of pattern-governed functioning, which in turn engenders more encompassing dynamic regimes of normative regulation up to the “rule-following” that constitutes the space of reasons.

Section 1: The initial characterization

The purpose of Sellars’ picturing relation is, roughly speaking, to accommodate the intuition that the truth of empirical statements should not be defined in terms of coherence (“semantic assertibility”) alone.³ Sellars introduces the notion of picturing in the context of an account of “factual truths”, with explicit reference to Wittgenstein’s “picture theory” in the *Tractatus* (SM 118; cf. also BBK and TC). One might question Sellars’ decision to associate the envisaged relationship terminologically with the *Tractatus* conception of elementary propositions as pictures

² For an elaboration of the irreducibility-cum-reducibility thesis implied by the ‘Janus-faced’ character see O’Shea, this volume.

³ Cf. TC, SM ch. 3, NAO ch.5.

of facts, since in the end, as Sellars admits, the dissimilarities outweigh the similarities and the Tractarian conception serves mainly as contrast.

I shall draw a sharp distinction between what I shall *initially* characterize as two dimensions of isomorphism between the intellect and the world:

- (a) an isomorphism in the real order
- (b) an isomorphism in the logical order

I shall use the verb 'to picture' for the first of these 'dimensions' and the verb 'to signify' for the second. I shall argue that a confusion between *signifying* and *picturing* is the root of the idea that the intellect as *signifying* the world is the intellect as informed in a unique (or immaterial) way by the natures of things in the real order. [Footnote: "this same confusion is the source of some of the more obscure features of Wittgenstein's *Tractatus*"] (BBK 50).

[We need to substitute] the schema

[natural-linguistic objects] $O_1', O_2', \dots O_n'$ make up a picture of [objects] O_1, O_2, O_n
by virtue of such and such facts about $O_1', O_2', \dots O_n'$

for the Tractarian schema

Linguistic fact pictures non-linguistic fact.

(...) The natural-linguistic objects, which, by virtue of standing in certain matter-of-factual relationships to one another and to these non-linguistic objects, constitute a picture of them in the desired sense, are the linguistic counterparts of non-linguistic *objects* (*not* facts)... [I]t is a system of elementary *statements* (*qua* natural-linguistic objects) that is the picture... (NAO 139, TC 215)

The basic idea of Sellarsian picturing is easy enough to understand in these formulations. Picturing is a relationship of causally founded co-ordination between two concrete collections of natural items. Items in one of these collections, so-called "natural-linguistic objects", fulfil two additional constraints: first, these items must lend themselves to use as material embodiments of the 'elementary' (empirical) statements of a language game L; second, they must exhibit the kind of uniformities that are produced once that game is played.

The simplicity of this solution is deceptive, however. Sellars' claim that the key to an adequate account of empirical knowledge, or more generally, of mind-reality connections, hinges on the proper appreciation of the Janus-faced character of language is a kind of pedagogical encouragement to probe this relation more systematically. In which sense can material items 'embody' the linguistic role of an empirical statement in a language game? Would they not have to be *either* material *or else* normative, in the sense in which the 'bishop' in a wooden chess game is either

the bishop *or else* a piece of wood, but cannot be both at the same time? If the causal order and the normative order are as strictly diverse as EPM makes them out to be, how could there be anything that we can conceive as belonging to both ‘orders’ at the same time? In other words, how are we to understand the hyphen in Sellars’ notion in “natural-linguistic objects”? Let us take a closer look.

Section 2: Natural-linguistic objects

“Natural-linguistic objects” are those natural items that can be said to picture. They are not necessarily the written or oral expressions of a natural language: they may be the hand movements of sign language, rhythmic patterns of an acoustic code, machine states of a Turing machine, or neurophysiological states. In fact, they include any collection of material items embodying a normative system as long as “there is a relevant degree of similarity” (MEV 331) between the functioning of these items in their system and the observation statements of a natural language. Importantly, the functioning of language is prior in the order of knowing, as the direction of elucidation goes from the functioning of written or uttered expressions in natural languages to the functioning of material signs in other normative systems. Thus a natural-linguistic object is a member of any collection of material items that we can take to be functional analogues of the observation statements of some natural language.⁴

But this does not imply that all natural-linguistic objects are ‘linguistic’ or ‘normative’ items in the sense of the ‘fully articulated’, explicit normativity exhibited by the languages we use to make candid observations, i.e., languages containing normative vocabulary and explicit inference rules. Material items that picture are

⁴ Sellars expressly introduces an “extended interpretation of the dot-quoting device” to allow for inclusion of non-linguistic functional analogues (MEV 340).

implicitly normative items that merely function like those that are explicitly subject to certain formative and inferential rules. In Sellars' view the distinction between normative items and items that function like them—or, as I shall put it, items with 'high-grade' and 'low-grade' normativity—provides the pivotal point for a “demystification of the place of mind in nature” (MEV 332). Before looking at the further implications of this distinction, let us first try to understand it in greater detail.

2a: Three conditions for low-grade normativity

In MEV Sellars labels collections of material items that embody a functional analogue of the observational part of a natural language as “representational systems.” Even though these are modelled on “animal representational systems” (MEV 326), the term ‘representational’ unhappily resonates with the presuppositions of the classical Cartesian notion of representation. Thus I will instead speak here of ‘orientation systems’.⁵ There are three conditions for membership in an orientation system.

First, orientation systems are systems that guide an agent, machine, or organism; they are not tools that are used. Even though we often use statements of natural languages instrumentally, there is “a more basic dimension” of language “presupposed by communication”, where utterances are neither speech acts nor even pragmatic routines. An orientation system must function in the way in which language functions when we are ‘thinking-out-loud,’ when we engage in “candid, spontaneous, overt verbal behavior”.⁶ In ‘thinking-out-loud’ language serves “as a medium in which we think” (MEV 327) and supports the cognitive orientation of speakers in an automatic fashion, by facilitating and blocking certain transitions

⁵ On the notion of orientation as replacement for representation in a theory of cognition cf. Seibt 2005a.

⁶ MEV 327. More precisely, a normative system N is an orientation system only if the functions of N include the functions of natural language statements in ‘thinking-out-loud’.

relative to a cognitive position. Sellars elucidates this form of unreflected cognitive operation by means of comparisons with position-sensitive action selection in a robot that is programmed to generate a map of its environment and adjusts its behavior relative to the data on this map.

Second, the material items embodying an orientation system must function like propositions. The internal composition (the syntactic structure) of such a propositional object is irrelevant. Sellars famously championed a *flatus voci* account of predication in which predicates merely provide materially different articulation contexts or, more generally, ‘tokening environments’ for names. But a natural-linguistic object must be something that can count as the embodiment of a proposition; it must have at least two different material features one of which can embody the function of unique positioning in spatio-temporal terms (traditionally construed as ‘reference’) and the other the function of positioning in a network of inferential relationships (—traditionally construed as ‘characterizing (something) as (being such-and-such)’).⁷

Third, in order for a collection of material items to count as an embodiment of an orientation system these items must exhibit uniformities corresponding to the tripartite rule set of a natural language governing language entry, intra-linguistic

⁷ Embodying the function of ‘characterizing as’ must not be construed as predication, however. The point of Sellars’ “Jumblese”—a language where different style designs of names replace predicate expressions—is that “not only are the predicative expressions of a language dispensable, but the very *function* performed by predicates is dispensable” (NAO 59), i.e., with the idea that anything in the tokening environment of a name—whether separate expression or style of sign design—has, as such, a semantic function. There is, in other words, an important distinction to be drawn in Sellars’ view between (i) the direct attribution of semantic functions to the material features of an item and (ii) the requirement that an item have two material features allowing for this item to be involved in two types of functioning in a certain game (cf. NAO 56ff and TTP). Note, though, that in some places in MEV Sellars unhelpfully employs the traditional philosophical idiom without scare quotes, obscuring the intended reinterpretation of the relevant terms. For example: “To have propositional form, a basic representational state must represent an *object* and represent it *as* of a certain character. In case of sophisticated [representational system] we speak of a basic representational state as *referring to an object* and *characterizing it* as thus-and-so.” (MEV 336) Or again: “A basic representational event is an event which has two characters: one by virtue of which it represents an object in its environment (or itself); another by virtue of which it represents that object as being of a certain character” (MEV 338).

transitions, and language departure moves. Ordinary maps are not embodiments of orientation systems since they do not document the inferences we draw from a map. Sequences of machine states in a Turing machine or sequences of neurophysiological states make better candidates for material embodiments of an orientation system in an organism since one may find in these not only the uniformities reflecting rules of positioning but also the uniformities reflecting rules of transition.⁸

The last two requirements for something's being a picturing or natural-linguistic object deserve additional elaboration.

(2b) Propositional form without propositions

In several places Sellars stresses that his *flatus voci* account of predication provides the "crucial step" to naturalist theory of mind (MEV 332); it is this part of his account of picturing that he characterizes as "the foundation of a correct account of meaning and truth" (NAO 58) and even as "Ariadne's thread to the labyrinth of metaphysics" (TTP 314). If predicates are shown to provide no more than tokening environments for names, one no longer can hold there is a radical difference between linguistic and non-linguistic representation systems. The importance of "the falsity of this latter notion", i.e., of the assumption that there is such a difference, "can scarcely be overestimated" (MEV 339). But why should it be so significant that only natural-linguistic *objects*, characterized and related, picture natural *objects*, characterized and related? Let us quickly consider the alternative of what Sellars calls 'standard semantics'. If a sentence (here taken to consist of subject expression, predicate expression and the copula) was said to picture a fact (here conceived of as complexes of a particular, a universal, and an exemplification nexus), picturing could not be said

⁸ This does not necessarily imply, however, that material embodiments of orientation systems must be temporally or even merely sequentially ordered—an interpreted formal system surely would do as well.

to be a causal *and* structure-preserving correlation—for what could then serve as the direct causal correlate of sentential predication, given that exemplification is a “nexus” or “tie” at best?⁹ Criticizing the standard theory in semantics Sellars remarks laconically: “To put it bluntly, propositional form does not belong in the order of nature” (NAO 70). But strictly speaking this remark is misleading as it stands. It is the *form of a judgment*, the form of ‘this *is* a white cube’, that does not belong into nature. What is in nature, both at the side of natural-linguistic objects and at the side of natural objects, are ontologically speaking non-composite items that *both* lend themselves to a double functionality of referring and characterizing that constitutes a ‘dot-quote proposition’, i.e., a proposition in its functional abstraction. In this purely functional sense of proposition the material items ‘this white cube’ and ‘this is a white cube’ are both propositions. However, and this is the point of Jumblese, Sellars’ illustration of a language without predicate expressions, *any* material item with the right material features is *potentially* a dot-quote proposition—in fact, a white cube itself is *potentially* also a dot-quote proposition! Propositionality is constituted by the way in which a material item functions within a linguistic community. Given that the two sets of material items correlated by picturing are supposed to be isomorphic, it is only for contingent reasons, or better, due to practical requirements, that only certain natural objects are used by humans with the double functionality characteristic of classical propositions. Thus Sellars’ ‘Ariadne’s thread to the labyrinth of metaphysics’ actually consists of two braids: (i) the idea that predicate expressions have no semantic function whatsoever but contribute as material items to the semantic

⁹ Cf. TTP and NAO ch. 3.

functions of a sentence, and (ii) the idea that propositional form extends beyond predication and can be purely functionally defined.¹⁰

Briefly, then, the functional definition of propositions in terms of the double functionality of locating and characterizing performed by *one atomic* natural-linguistic object, the sentence, is the key to ensuring that natural-linguistic items can be said to stand in isomorphic or structure-preserving relationships to natural items, *and* belong entirely, not only partly, to the natural order. If predicates were anything else but the articulation contexts of names, if names could be articulated without an articulation context, if we were to allow for any compositionality of the semantic function of a sentence beyond the purely nominal distinction between referring and characterizing, we would need to postulate in nature a causal correlate for logical predication—in Sellars' view an absurdity—or give up on the attempt to ground empirical judgements in causal relations.

But there is a further benefit involved in the adoption of a radical *flatus vocis* approach. Once propositional form is recognized as consisting in the double-functionality of an atomic natural-linguistic item, orientation systems might be embodied in material objects that differ in structure and complexity radically from sentences in natural or programming languages.¹¹

¹⁰ Sellars' views on predication seem intimately connected with his discussion in SM and IKTE of Kant's famous 'Clue' in the first Critique, namely, the claim that "the same function which gives unity to the various representations *in a judgement* also gives unity to the mere synthesis of various representations *in one intuition*" (Kant A79; B 104-5). As Sellars reconstructs the passage, the 'this-such' nexus in a conceptualized intuition, constituting experiential contents such as *this white cube*, and the predication in a judgment, constituting the content of empirical statements such as *this is a white cube*, involve the same cognitive functions, those characteristic of propositional form—the transition is one of "the same content" occurring "in explicitly propositional form" (SM 5).

¹¹ This last point is stressed by Jay Rosenberg, who argues that Sellars' discussion of "animal representation systems" contains the answer to the question of whether and how theoretical statements of science can picture. Even if theoretical physics does not identify microphysical entities by means of proper names, Rosenberg argues, we can treat definite descriptions "from the point of view of their representational function, as 'simple signs'" (2007: 114). See also Sellars SM 124. To flesh out Rosenberg's idea somewhat differently, the functional definition of propositionality allows us to claim that mathematical representations in science, despite their internal inferential complexity, can qualify as atomic natural-linguistic objects to the extent to which they can be shown to have the same double

(2c :) *Two notions of inferential form*

The third of the requirements mentioned above says that picturing natural-linguistic items should exhibit uniformities that reflect the tripartite rule system of a language.¹² There are two ways in which this requirement may be fulfilled. Sellars distinguishes between Humean systems that exhibit uniformities reflecting inferences where quantified premises or conclusions remain implicit, and Aristotelian systems that exhibit uniformities embodying all steps of deductive and inductive inferences. A Humean orientation system does not use conjunction or negation signs but rather operates with what one might call *modes of presentation* that implicitly have the logical force of conjunction and negation—conjunction is the mode of co-presence, and negation is the mode of rejection (MEV §96).¹³ We can reconstruct the operation of Humean orientation system—its transitional “associative propensities”—by *mentioning* logical operations, but “only by the confusion involved in what James called the Psychologist’s Fallacy can we be taken to *ascribe* logical operations to the Humean [orientation system]” (MEV§101).

On the other hand, human “thinking”, Sellars insists, can only be understood on the model of Aristotelian orientation systems, which “contain items which function as do logical connectives and quantifiers, i.e., have logical expressions in their

functionality as an atomic logical formula. In microphysics, for example, candidates for natural-linguistic objects might be a state vector in Hilbert space, representing the state of a single particle system and thus functioning like ‘F(a)’, or a state vector in Fock space, representing the interaction of ‘particles’ in terms of a distribution of field quanta and thus arguably functioning like ‘Rⁿ(a...a_n)’.

¹² For some exegetical and technical difficulties with this requirement see Rosenberg 2007.

¹³ Remarkably, in MEV Sellars does not elaborate on the ‘mode of presentation’ that carries the logical force of existential quantification. While in SM he postulates that such “molecular” natural-linguistic objects picture in the sense that they “pick out sets of pictures within which they play no favourites” (119), in MEV he merely associates transitional propensities (‘triangle at x → ~square at x’) with universal quantification. The question of whether there is a specific mode of presentation associated with existential quantification, whether natural-linguistic objects with existential quantifier signs picture in the mode of negation (of a universal quantification), or whether they picture indeterminate, non-particular natural objects, raises deep systematic issues beyond the space of this paper.

vocabulary” (ibid. §83). Aristotelian orientation systems have two types of elements, atomic and “molecular”, i.e., containing logical expressions, while this contrast does not make sense for a Humean orientation system: here all sentences are ‘atomic’, albeit presented in different (e.g., rejective or conjunctive) modes. This has an important consequence. While in a Humean orientation system *all* elements can be said to picture, in an Aristotelian system this holds only for the atomic elements since the logical expressions of these systems do not stand in one-one relations to natural objects.

The claim that something is a natural-linguistic object standing in a picturing relation thus is systematically ambiguous not only with respect to how propositional form is materially embodied (with or without predicate expressions), but also with respect to whether the inferential role it has is “pre-logical” or “logical.” Presented with two material elements of a system, θ and ϕ , and a transition from θ to ϕ , we can take these elements to function like the natural-linguistic objects ‘triangle/ x_P ’ and ‘circle/ x_R (in the modes ‘presentation’ (P) and ‘rejection’ (R)) of a Humean orientation system, directly connected by association, or to function like the natural-linguistic objects ‘triangle there’ and ‘not-circle there’ of an Aristotelian system connected by logical inference via an additional quantified premise (MEV 99). It is important to see, however, that the latter interpretation depends on the former: the atomic sentences of Aristotelian orientation systems picture only because they have functional analogues in Humean systems. To be sure, it is Aristotelian, “logical [orientation systems]” that provide the elucidatory model for language “as the medium in which we think”; to restate, Sellars insists that the normativity of human thought or the “space of reasons” cannot be adequately captured by transition propensities of Humean orientation systems that merely “ape” reasoning. And yet,

the ‘representational’ character of Aristotelian orientation systems derives by functional analogy from the ‘representationality’ of Humean orientation systems, where inferential role and propositional form remain implicit and all elements of the system can be said to be in one-one correlations with natural objects (MEV 99,100).

In sum, natural-linguistic objects or picturing items are, in the first instance, items with low-grade normativity: with implicit propositional form and implicit inferential roles, “pre-linguistic” (MEV § 57) items which function in certain central ways like linguistic entities. There is a curious epistemic interdependence between low-grade and high-grade normative items. It is only due to the functional likeness with observational sentences that certain material aspects of a cognitive system can be treated as *more* than natural objects—we need high-grade normative objects to recognize low-grade normative objects. On the other hand, it is only due to the isomorphic correlatedness of low-grade normative items that we can attribute any ‘representationality’ to our observational language.

Whether the low-grade normativity of ‘natural-linguistic objects’—i.e., actually: ‘natural-pre-linguistic objects’—establishes a coherent conception of such hyphenated entities shall concern us further below. Let us now turn to the other end of the picturing relationship and investigate those items that are said to get pictured.

Section 3. Natural objects and the transcendental role of picturing

“Natural objects” are the causal antecedents of (functional analogues of) observation statements or perceptual judgments. But precisely what, in metaphysical and ontological terms, are “natural objects”? At first blush, Sellars’ answer appears overly sparse. From explicit discussions of picturing (TC, BBK, SM ch. 3, NAO ch. 5) we can glean the following. (i) A natural object is an item that can be pictured. (ii)

A pictured object is something mentioned in a scientific theory of picturing, i.e., a theory of human perception and the production of perceptual judgments (or of functional analogues of these in machines). (iii) Such a theory sets up a ‘projection table’ or “method of projection” (SM 139) correlating natural objects with natural-(pre)-linguistic objects that are (the functional analogues of) observation sentences. (iv) This correlation is a bijective structure-preserving mapping, which means that there are no structural differences between the entities correlated. (v) The correlation is causally established, possibly mediated by a complex interaction of causal processes past and present.

Upon inspection, however, we can see how these few characterizations suffice to develop, in the context of Sellars’ discussion of scientific realism, his answer to the problem of the metaphysical status of natural objects and their ontological features. Given that natural objects are ‘referents’ of (actual and possible) scientific theories of picturing, the question has shifted to the metaphysical status of scientific objects: are natural objects *qua* scientific objects real, and if so, in which sense?

Sellars’ position on the reality of scientific objects would seem, at first glance, to derive from his famous *scientia mensura* principle in EPM (§42): “in the dimension of describing and explaining the world, science is the measure of all things, of what is that it is, and of what is not, that it is not.” But by itself this principle is neutral with respect to any metaphysical commitments. We could take the principle to speak about the domain of real existents in the sense of unconceptualizable ‘things-in-themselves’ or at least in the sense of extra-mental and mind-independent entities. But we might also identify ‘what there is’ with the Kantian world of experience, a domain of extra-mental but mind-dependent entities. All three of these readings are

compatible with what is actually at issue in Sellars' invocation of the *scientia mensura* principle, namely, to highlight that naturalism is a position that contains a parameter: as science changes over time, so does the domain of natural entities and—*vide* the debate about the mind-dependency of microphysical entities—even their metaphysical status, the kind of reality we can ascribe to them.

Sellars' explicit commitments to a "scientific realism" are equally of limited use for any attempt to clarify the metaphysical status of scientific objects. For scientific realism is not a *premise* in Sellars' scheme. He introduces scientific realism as consisting of (a) a claim about the representationality of theoretical terms, contrasting with instrumentalism, and (b) a claim about the primacy of the scientific description of the "world":

To take a realist stance towards scientific theories is to take seriously this role of theoretical language as providing a method of picturing the world (SM 171).

Thus the Scientific Realist need only argue...that the language [of "physical theory"] could replace the common sense framework in all its roles, with the result that the idea that scientific theory enables a more adequate picturing of the world could be taken at its face value (SM §90)

Both of these claims depend on the notion of picturing already being in place. Thus we seem to move in a circle: in order to determine the metaphysical status of natural objects, i.e., of the entities that are said to get pictured, we need to investigate the role picturing is to play in Sellars' arguments for scientific realism. As shall become apparent presently, however, the notion of picturing at play in the latter context is the minimal conception of a causally established isomorphism between natural and natural-linguistic entities whose metaphysical status is unspecified, and thus no circularity arises. Let us then move on and clarify in which ways Sellars employs the notion of picturing to argue for a certain type of scientific realism, which in turn will

enable us to determine the metaphysical status of the natural entities we picture with our observation statements.

Sellars' scientific realism is developed from within a philosophical program of analytical philosophy that takes its metaphysical bearings from Kant rather than from Hume, and thus centrally includes—in John McDowell's characterization—"the transcendental task...[of] entitling ourselves to see conceptual activity as directed toward a reality that is not a mere reflection of it."¹⁴ In Sellars' view the 'transcendental task' can only be discharged via the naturalization of intentionality (or mental representation or primitive aboutness, respectively) by combining a functional account of mental content with a causal relationship replacing aboutness. The strategy becomes fully visibly only in SM, where Sellars supplies the first extended discussion of picturing. Even though Sellars highlights that picturing plays the key role in his solution to the transcendental task, the text leaves room for controversy about the structure of the underlying argument. John McDowell takes Sellars to establish the "objective purport" of observation statements by merely relying on the fact that picturing relationships are the content of a scientific theory, charges this move with "scientism", and concludes that "Sellars' attempt to be responsive to Kantian concerns goes astray in his idea that an appeal to science could do the transcendental job".¹⁵

In my view Sellars takes a different route in implementing 'the transcendental job'. In order to ground the "objective purport" of observation statements in McDowell's sense, i.e., in order to ensure that observation statements can be said to relate to a reality that is 'not a mere reflection of our conceptual activities' Sellars does indeed appeal to the fact that picturing relationships are part of empirical

¹⁴ McDowell 1998, 473.

¹⁵ McDowell 1998, 467, 469, fn.

science, but this appeal does not involve or presuppose the scientific trust in the representationality of scientific statements. To the contrary, the claim that the natural objects pictured by scientific statements are real entities is the conclusion of the argument, not a premise. Sellars has us realize that the conditions for the possibility of entitling oneself to a strong notion of empirical truth as correspondence to real items are surprisingly modest, once one has given up on the idea of primitive aboutness or that contents are directly related to items in reality. Let us review these conditions step by step.¹⁶

(1) There must be certain uniformities in sets of natural objects that can be viewed as an isomorphism between two sets of such natural objects.

(2) We must be able to recognize that one of two isomorphic sets of the natural items, call it S, functions as a language. This means that S must be involved in further uniformities that we can consider as reflections of the tripartite rule system of a language or orientation system. In other words, we must be entitled to consider one set of the correlated natural objects as *natural-linguistic* objects.

(3) We must be able to associate the purely factual descriptions of isomorphic correlations of natural and natural-linguistic objects with the language entry rules (ought-to-bes) of an orientation system or language: “in thinking of pictures as correct or incorrect we are thinking of the uniformities involved as directly or indirectly subject to rules of criticism” (SM 136). For example, we must be able to associate (i) and (ii):

- (i) *Projection table*: red objects (in standard conditions of observation for suitably prompted speakers) are followed by utterances of *this is red*.
- (ii) *Language entry rule*: it ought to be that suitably prompted speakers of English in standard conditions of observation respond with a ‘this is red’ to red objects

¹⁶ The following is essentially a reconstruction of SM ch. 3, but for the first two steps see e.g., SRLG and NAO 123ff.

(4) We must be able to compare several such correlations of natural and natural-linguistic objects or projection tables. That is, from our position within one orientation system or language or, using here for convenience Sellars' generalization over languages, from within one "conceptual structure" we must be able to compare the language entry rules and thus the associated projection functions of several conceptual structures.¹⁷ Such language- or conceptual-structure-internal comparisons of the functional set-ups of other languages or conceptual structures or orientation systems are possible due to our capacity of performing functional abstractions.

(5) We must be able to recognize that the differences in the functional set-ups of conceptual structures or orientation systems dovetail with differences in practical consequences. We must be able to recognize *that some conceptual structures or orientation systems support our navigational tasks—in a broad sense of this term—better than others*. Science is a type of interaction with our environment that serves the declared purpose of improving our navigational capacities by generating better orientation systems. Thus the fact that science improves our interaction with nature is the condition for the possibility of taking the mere *difference* in the set-up of projection systems generated by doing science as a *difference in practical adequacy*. In other words, Sellars "scientism", in the sense of an unjustified premise, is very weak indeed—it consists merely in the observation that the conceptual structures or orientation systems produced by science can be considered as practically more adequate projections to the extent to which they improve our interaction with nature.¹⁸ Sellars takes science to be a particular form of theory construction (i.e., a particular way of setting up orientation systems) that (i) includes a controlled interaction with

¹⁷ More precisely one should speak here and in the following paragraphs not of languages or conceptual structures but rather of the empirical parts of these alone, of their so-called "world stories".

¹⁸ A new scientific theory improves on our navigational capacities if relative to it there are fewer unexplained events and more predictions coming true, cf. SM 141.

nature, (ii) postulates theoretical entities, and (iii) *de facto* improves our navigational capacities and our interactions with nature.

(6) We must be able to translate differences in practical adequacy of orientation systems into differences of representational adequacy. We can't do this directly, since the fact that we can recognize practical differences of conceptual structures and their associated 'projection tables' or scientific accounts of perception, has, as such, no implications for their relationship to reality. For instance, the fact that a dot-quote 'this-particle-with-momentum-m' of conceptual structure CS_1 yields better navigational results than a dot-quote 'this-substance-with-impetus-i' of CS_2 has not, as such, any implications as to the greater representational adequacy of CS_1 vis-à-vis reality—the isomorphism between the natural-linguistic objects of CS_1 and the natural objects postulated by CS_1 does not say anything about how (or that) the latter relates to reality. But assume that there is a scientific theory CS_P that ideally supports our navigational tasks, i.e., leaves nothing unexplained, nothing unpredicted, and all its predictions come out right.¹⁹ The structure of $\langle N \rangle$ of natural objects in the 'domain' of the projection table of CS_P must then be isomorphic to reality—these objects and the natural-linguistic objects that picture them can be considered a structural repetition and thus a re-presentation of reality. But if, in the ideal limit of the development of science, natural objects can be viewed as stand-ins or representatives of real items, then we are entitled to view them as standing in the dimension of representativeness also before the development of science has reached its ideal limit. We may then speak of less-than-perfect orientation systems as being

¹⁹ That we can conceive of such an ideal conceptual structure imparting ideal navigational capacities is made possible by the observation of relative improvements of our navigational capacities; cf. Seibt 1990, 224ff.

isomorphic to structures of natural objects that are themselves less-than-perfect proxies of real items.²⁰

It is important to realize that Sellars' reference to Peirce does not amount to a switch to an 'external', non-transcendental point of view. Sellars writes:

Peirce himself fell into difficulty because, by not taking into account the dimension of 'picturing', he had no Archimedean point outside the series of actual and possible beliefs in terms of which to define the ideal or limit to which members of this series might approximate (SM 142).

This passage has been read as suggesting that picturing would supply us with such an Archimedean standpoint.²¹ But I think Sellars meant to point out something completely different: *given that there is no Archimedean standpoint*, we cannot make sense of the limit of science in terms of a series of possible beliefs; however, there is another way to define that limit, namely, as the perfect map. The perfect map is a full proxy or replication, which allows us to treat the causal isomorphism of picturing as re-presentation and to view natural objects as described by imperfect maps as imperfect stand-ins of reality. The conceivability of an isomorphism between the ideal conceptual structure and reality does not imply that reality—neither now nor in the ideal limit of science—would be a 'mere reflection of our conceptual activities'. This is ensured by the requirement that picturing relationships are established in the course of doing empirical science, which is essentially interactive.

This concludes my brief reconstruction of Sellars' approach to the 'transcendental task'. In a nutshell, Sellars argues that we are entitled to a notion of empirical truth as correspondence to a reality that is 'not a mere reflection of our conceptual activities', since our claims about picturing relationships are gained by means of a reliable interactive method that in the ideal limit would generate a full

²⁰ This line of argument would have appeared particularly motivated and attractive to a logical empiricist trying to accommodate a neo-Kantian structuralist account of reality, such as the author of *Der Logische Aufbau der Welt*, a work Sellars was well-familiar with and might have drawn some inspiration from, cf. Seibt 2000a.

²¹ Cf. Rosenberg 1975.

structural duplicate of reality. Full re-presentationality of scientific statements in the ideal limit entitles us to assign to current scientific statements a certain degree of re-presentationality at least. Scientific realism does not figure as a premise in this argument, which assumes of science nothing more than the rather uncontroversial claim that the scientific method serves to optimize our navigational capacities. Rather, it is a consequence of this argument—and this is the answer to the question posed at the beginning of this section—that natural objects, scientific objects, are more or less perfect stand-ins (structural representatives) for real entities.

Of course, there is another and much shorter path to a transcendental argument in support of the “objective purport” of our conceptual activity:

Whatever else language does, its central and essential function, the *sine qua non*, is to picture us the world we live in” (NAO 137).²²

If it could be shown that it is a condition for the possibility of any language that its observation statements stand in picturing relationships to real entities, Sellarsian scientific realism would not depend on any assumptions about empirical science, not even on the latter’s characteristic practical features as causal method for the improvement of our navigational capacities. As I will argue in the following final section, in his last writings Sellars embraces this shortcut to the transcendental task in the course of investigating the concrete implementation of picturing, setting intriguing pointers to a naturalist interpretation of linguistic normativity.

Section 4. Picturing happens (partly) by sensing

Picturing is said to be a “relation, indeed, a relation between two relational structures” (SM 135) and, following Wittgenstein, Sellars often specifies the logical properties of this relation in mathematical terms as “projection” and “isomorphism”.

²² Reading ‘reality’ for Sellars’ usage of “world” in the given context.

But these characterizations of the inferential or logical properties of statements about picturing relationships do not imply that picturing belongs ontologically into the category of relations. In fact, Sellars early illustrations of implemented picturing are mechanical non-linear process structures, physically implemented learning algorithms with feedback loops.²³ The decisive clues for the ontology of picturing, however, we find in Sellars' late writings from 1980/81, in BLM, MEV, and FMPP, where Sellars illustrates 'picturing' with the orientational capacities of biological systems—robots and rockets now give way to rats.²⁴ This is a significant change since until then Sellars had used evolutionary explanations only as a "model" for an explanation of language acquisition by social conditioning, without considering the evolutionary explanation of language itself. In MEV Sellars takes that further step, with some hesitation.

Such representational systems (RS) or cognitive map-makers, can be brought about by natural selection and transmitted genetically, as in the case of bees. Undoubtedly a primitive RS is also an innate endowment of human beings. The concept of innate abilities to be aware of something *as* something, and hence of pre-linguistic awarenesses is perfectly intelligible (MEV 336).

The causal relation of picturing is now for the first time further specified as a result of evolutionary reinforcement, and human languages are presented as deriving from the sophistication of animal orientation systems.

However, the evolutionary explanation of language offered here merely establishes that orientation systems can be thought as 'innate' in that they can be thought as serving some evolutionary function or other. Sellars does not argue here that the particular function that renders orientation systems an evolutionary advantage is the fact that they contain world-coordinated natural-(pre)-linguistic objects. In other words, these passages do not yet suffice to establish that the condition for the

²³ NAO 123ff, BBK 53.

²⁴ But note that Sellars was deeply interested in stimulus-response learning already in the 1940s, and in his 1954 SRLG (326f.) he suggests that particular instances of pattern-governed behavior have a causal explanation in evolutionary terms.

possibility of languages (or, more generally, orientation systems), the “condition *sine qua non*”, is the ‘representationality’ or world-coordinatedness of their natural-(pre)-linguistic objects. In order to discharge the ‘transcendental task’ mentioned above, in order to show that our observation statements are related to a reality that is ‘not merely a reflection of our conceptual activities’, one must show that nothing else but ‘representationality’ is the feature why language is selected for in evolution.

This is a formidable assignment since it will also not do to explain in evolutionary terms the existence of one-to-one correlations between sets of natural objects such that one of these *can be interpreted* as language. It will not do argue that there are biological systems exhibiting behavior (such as the dance of the bees) to which we *can* apply the normative vocabulary that characterizes linguistic episodes.²⁵ Rather, what needs to be shown is that world co-ordinatedness is the evolutionary condition for the possibility of a certain class of natural items that would not exist if they were not involved in normative functioning: that world-coordinatedness and the specific normative functioning of ‘natural-(pre)-linguistic’ objects are selected for in combination.

Briefly, the shortcut to the ‘transcendental task’ via the necessary ‘representationality’ of language requires that an evolutionary argument for the “Janus-faced character” of language. Sellars himself nowhere supplies such an argument but, as I shall suggest in the remainder of this section, his process-ontological vision in the Carus Lectures (FMPP) prefigures the relevant foundational moves. Following the trajectories of FMPP we find in recent work on the

²⁵ For such a ‘merely ascriptive’ approach compare for instance Ruth Millikan’s account of naturalized intentionality: “The intentionality lies not in the function of the dance, but in the explanation of how the function is performed, in the principle involved. Roughly, the principle is mathematical isomorphism. Variations in possible bee dances to which worker bees are designed to respond correspond one-to-one to variations in possible location of nectar in such a way that being guided by the dances produces arrival at sites of nectar. Why is this intentionality? Because the dances display the characteristic trait of the intentional: namely, they can be wrong or false.” (2003: 97)

naturalization of normativity observations and strategies that can be used for the purpose of developing an evolutionary argument for natural items which could not exist if they were not ‘Janus-faced’, i.e., both normative and world-coordinated.

To restate, as the label should have suggested all along, ‘picturing’ is implemented by a process, a process that—setting now mechanical illustrations aside—is part of the complex interactivity of a biological species and its environment. But there are many varieties of process. In FMPP Sellars envisages a new categorial guise for both picturing and pictured entities in terms of a category of “absolute or pure processes”, i.e., ways of happening without substratum. Such ‘pure dynamics’ we can, in first approximation, conceive of *in analogy to* the denotations of common sense sentences with ‘dummy subjects,’ such as ‘it is snowing’, ‘it is lightening,’ or ‘it is hurting’. Within an ontology of pure processes, Sellars suggests, we could differentiate types of physical processes in terms of their dynamical context. We could distinguish between the one hand, so-called “physical-2” processes that constitute “what goes on in non-living things and insensate organisms” —for instance “what in a humorous vein we might refer to ...as electronings and quarkings”—and, on the other hand, so-called “physical-1” processes that would be “the transposition of *sensa* into the framework of absolute process” such as “C#-ings” and “reddings” (Sellars FMPP §114f.).

The category of pure processes has two unusual features that are crucially significant for the interpretation of Sellars’ account of picturing, and, also more generally it appears, for a successful approach to naturalist account of cognition. First, pure processes are non-particulars.²⁶ In traditional ontology ‘particulars’ are

²⁶ In the concluding paragraph of PSIM (quoted below) Sellars explicitly commits himself to “non-particulate items” but in FMPP Sellars obscures this feature by using the same label, “absolute process”, for the category of nonparticular items as well as for the model of that category, spatiotemporally localized ‘C-sharpings from that corner now’, which are particulars; see Seibt 2000b

necessarily located in one determinate, bounded (and mostly topologically connected) spatio-temporal region. In contrast, pure processes exist in space and time in determinate or indeterminate locations. (Such indeterminately located individuals we usually make reference to when we reason about stuffs, as in ‘the water in the Alps is getting warmer’ or ‘sodium chloride dissolves in water’). While particulars are individuated in terms of their location, pure processes are individuated in terms of how they operate or function. (This is familiar from the individuation of activities: whether swimming differs from running, or combustion from electromagnetic radiation, depends on operational aspects.) As non-particular individuals pure processes can play the role of a pre-conceptual sensory manifold that is indeterminately located in a region encompassing the organism and its environment.²⁷

Second, processes combine and interact in ways that are quite different from the ways in which things may be aggregated or assembled. The theory of cognition has been hampered, Sellars claims, by a focus on causal structures that fit the interaction of things but not those of processes.

This sufficiency of mechanistic variables, combined with the almost tangible *thingishness* of physical objects and with an impact paradigm of causation made it difficult to conceive of a mode of causation in which the development of a system of material particles might be influenced by nonmaterial items, whether *states* of a ‘mind’ or Hobbesian *objects* (appearances)” (FMPP §102).

That is to say, whereas the objects of contemporary neurophysiological theory are taken to consist of neurons, which consist of molecules, which consist of quarks...--all physical-2 objects—an ideal successor theory formulated in terms of absolute processes (both physical-2-ings and physical-1-ings [sensings]) might so constitute certain of its ‘objects’ (e.g., neurons in the visual cortex) that they had [physical-1-ings, sensings] as *ingredients*, differing in this respect from purely physical-2 structures (FMPP § 124, my emphasis).

and 2007: 127ff. The interpretation of pure processes as non-particular entities I offer here is inspired by the features of the basic category of the theory of ‘general processes’, which is a further development of Sellars’ process-ontological intuitions, cf. e.g. Seibt 2005b, 2008.

²⁷ One of the trajectories that can be drawn out from FMPP thus leads from Sellars’ discussion of the Kantian forms of intuition space and time in sensing (e.g., SM ch. 1) to recent arguments about the “embodied mind” and “non-trivial causal spread” in cognitive science, aiming to show that certain cognitive phenomena—e.g., sensing—‘ain’t in the head’ but spread out over extra-neural (environmental) and neural processes which constitute these phenomena in combination, cf. e.g. Thelen/Smith 1994, Keijzer 1998, Wheeler/Clark 1999, Wheeler 2001.

From the present vantage point, we can take Sellars here to grope at ideas of self-organization, downward causation, emergence, or complexity. While it might have seemed unduly speculative in 1981 to challenge the particularist billiard ball model of causation, today dynamic systems theory provides a respectable theoretical context to advance the claim that a certain activity is an ‘ingredient’ or emergent dynamics of another activity. Moreover, applying dynamic systems theory to the philosophy of mind, proponents of the so-called “dynamic hypothesis” in cognitive science have since worked out a strong scientific paradigm for anti-representationalist accounts of cognitive functions that explicitly confirm the Sellarsian notion of sensing as an ingredient or emergent dynamics of ‘neuroning’ just as metabolism is an emergent dynamics of the interaction of chemicals in a cell, or a virtual metronome an emergent dynamics of the swinging of linked pendulums.²⁸ It is important to note, however, that the mathematical description of emergent phenomena in dynamic systems theory to some extent obscures the ontological requirements for emergent causation, which Sellars was fully aware of and responded to in FMPP. Only pure processes or any other category of dynamic non-particular individuals affords a coherent description of emergence at the ontological level.²⁹ Only if processes are categorized as ‘subjectless goings-on-thus-ly’, the interaction of processes may, in the context of certain process architectures, amount to a different way of going on, i.e., to the emergence of a ‘new’ process.

From these more general ontological observations let us now return to the interpretation of picturing. In FMPP Sellars suggests, quoting from PSIM, that in the context of a suitable process architecture the goings-on-thus-ly of physical processes constitute the going-on-thus-ly of sensing:

²⁸ Cf. in particular the seminal contributions by Van Gelder (e.g., 1995 and 1998), Thelen & Smith 1994, Wheeler 2005.

²⁹ Cf. Seibt 2008.

[W]hen it comes to an adequate understanding of the relation of sensory consciousness to neurophysiological process, we must penetrate to the non-particulate foundation of the particulate image, and recognize that in this non-particulate image the qualities of sense are a dimension of natural process which occurs only in connection with those complex physical processes [which are currently categorized as the central nervous system] (PSIM 37)

The natural continuation of this line of thought would be to claim that under suitable conditions the going-on-thus-ly of sensing may go on in the ways that constitute the going-on-thusly of imagining and further of judging. Sellars does not explicitly add this further step in FMPP, but his discussion of sensing, imagining, and judging in SM and IKTE supplies sufficient pointers, I believe, for a process-based emergentist model of cognition that challenges the idea that there is a clear line between the physical, the sensory, and the conceptual way of going on of natural processes.³⁰ Moreover, the process-based model of cognition also precisely goes against the thought of a clear line of demarcation between the causal and the normative.³¹ Rather, the suggestion is that there is a whole spectrum of ways of going-on or functioning, and even though we can *contrast* the ends of the spectrum, i.e., the merely causal and the merely normative of the conceptual, there is a range of intermediate functioning between mere causes and proper reasons. Such intermediate functionings are causal processes with what we called above the 'low-grade' normativity of Humean orientation systems and degrees of normativity even lower than that.

It is here then, in the range of causal dynamics with various degrees of 'low-grade normativity' that we find the most suitable candidates for 'natural-linguistic objects', those curiously 'hyphenated' entities that in Sellars' scheme 'do the picturing.' Some of these dynamics also fulfil precisely the condition needed for our shortcut to the transcendental task. They occur only in normative contexts and their

³⁰ Cf. SM ch. 1 and 2, and IKTE II.

³¹ As attributed to Sellars in McDowell 1998.

very occurrence entails their 'representationality' or world-co-ordinatedness. This at least is the core idea of the so-called "interactivist" interpretation of mental representation recently championed by theoretical biologists and cognitive scientists, a process-based theoretical model that fits Sellars' philosophy of mind particularly smoothly, as I want to sketch briefly in the following paragraphs.³²

World co-ordinatedness, or so proponents of interactivism argue, is only one type of natural normativity that begins already at the level of so-called self-maintaining systems, i.e., process configurations that exist far from the thermodynamic equilibrium and maintain their existence for a certain amount of time. The components of such process configurations presuppose each other; for example, to use the interactivists' canonical illustration, in a burning candle the main component processes, viz., melting of the wax, percolation of wax in the wick, combustion, air convection that adduces oxygen and carries away residues, all feed into each other. That one process in this configuration occurs (or fails to occur), is functional (or dysfunctional) for the existence of any other and the configuration as a whole, thus endowing the entire non-linear causal configuration with rudimentary normativity as a system of items that are functional for each other.³³ To be sure, the sense in which component processes of self-maintaining systems serve a function is far remote from the usual, 'intentional' account of function as fulfilling a certain purpose or design. But unlike regulatory cycles with positive or negative feedback in arbitrary natural processes self-maintaining far-from-equilibrium systems cannot be described exhaustively in a purely causal idiom. While the increase or decrease of a

³² Cf. in particular Christensen/Bickhard 2002, Bickhard 2003, Bickhard 2008, Hooker 2008, Levine 2008.

³³ "A [far-from-equilibrium] system is autonomous (self-maintenant) if it interactively generates the conditions required for its existence...contributions to autonomy are the basic instances of *servicing a function*...the asymmetry functional/dysfunctional is derived in this model from the fundamental physical asymmetry between far-from-equilibrium and equilibrium systems" (Christensen/Bickhard 2002:19)

existing process can be described as the causal effect of another, a richer dependence relation is necessary to describe a process configuration where all component processes depend in their very existence on each other. Thus the functionality of the components of self-maintaining systems is not a matter of ascription—the existence of a self-maintaining system is a functional norm put directly into nature.

Organisms are a more sophisticated type of such self-maintaining systems—they are “recursively self-maintenant” in that they can maintain the conditions for their self-maintenance by suitable interactions with their environment. To use again the standard illustration offered by interactivists, a bacterium, for example, has a chemical mechanism that causes the bacterium to swim if moving up a sugar gradient (environmental dynamics A) and to tumble if it is moving down a sugar gradient (environmental dynamics B). In other words, a bacterium-cum-environment is a process configuration P that includes a rudimentary version of an orientation system: an internal dynamics α that co-occurs with environmental dynamics A and engenders swimming and an internal dynamics β that co-occurs with environmental dynamics B and engenders tumbling. The normativity of these transitions is the functionality of self-maintenance: P could not persist without α and β which in turn are internally related to A and B—their very occurrence depends on their being functional for P, which they are only insofar as their occurrence presupposes the co-occurrence of A or B, respectively. The occurrence of α and β thus entails their ‘representationality’ or world co-coordinatedness, and, vice versa, their world co-ordinatedness is also the warrant of their functionality or (‘low-grade’) normativity.³⁴

Different types of organisms involve such basic ‘representational dynamics’ in different and often highly complex dynamics. Basic world-coordinated internal

³⁴ Cf. Bickhard 2003: 139ff.

dynamics may get 'caught up' in the dynamics of Humean or even Aristotelian orientation systems. But in so far as the latter 'high-grade' normative ways of functioning are emergent on the occurrence of processes with less than 'low-grade' normativity and their 'built-in' world co-ordinatedness, the very occurrence of an observation statement can be said to entail its representationality as the "sine qua non of language" in evolutionary terms.

Conclusion

The dimension of givenness that is under attack in EPM is the classical Cartesian conception of mental representations. Working towards a replacement account, Sellars postulates that episodes with cognitive content are *qua* "natural-linguistic objects" causal representatives of natural objects, correlated with the latter by a structure-preserving mapping. I highlighted that this relationship, called 'picturing', holds in the first instance only for natural-linguistic objects with "low-grade normativity", for pre-linguistic orientation systems, and only derivatively for observational statements or linguistic orientation systems. The main purpose of picturing is to warrant "a dimension of givenness that is not in dispute", i.e., of ensuring the world-directedness of world co-ordinatedness of orientation systems. I suggested that Sellars' final strategy here seems to be to claim that the causal representationality of languagings is entailed by their very existence and to argue for this claim in evolutionary terms. Even though Sellars has not completed this argument, his process-ontological description of the cognition at the level of the "sensory-body problem" combines well with recent "anti-representational" descriptions of sensing and mental representation in cognitive science, and in particular within the so-called 'interactivist paradigm'. The particular interest of this

combination lies in the fact that it shows us a way for how to leave the metaphor of the ‘Janus-faced’ character of language behind and approach the ‘hyphenated nature’ of “natural-linguistic” objects in a theoretically more coherent fashion. Once we adopt a process ontology we can integrate normativity into Sellars’ naturalist scheme as modes of functioning, arranged in an emergent hierarchy, leading from mere causing to reasoning proper.

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