> Only if when we consider any other given place in the universe we can regard the action of all matter as passing through it without resistance and without loss, and the photograph of the whole as translucent: Here there is wanting behind the plate the black screen on which the image could be shown. Our "zones of indetermination" [organisms] play in some sort the part of that screen. They add nothing to what is there; they effect merely this: That the real action passes through, the virtual action remains. (1896/1912, pp. 31–32)

Put in holographic terms, the brain is now seen as a modulated reconstructive wave "passing through" a holographic field. The reentrant architecture, the resonant feedback loops, the "scales" of neural dynamics all ultimately support this modulated wave. As a wave traveling through a hologram specifies a virtual image, this brain-supported wave specifies a time-scaled, virtual subset of the field related to the body's action.

There is no homunculus here viewing a reprojected wave front (image). First, due to the holographic nature of the field, wherein each point carries the information for the whole, there is an elementary or "pure perception" in Bergson's terms defined across the field at the null scale. This is reinforced by the time-motion of the field, a motion that must be treated not as a series of discrete states or "instants" but as indivisible. As does Nottale (1996) now, Bergson rejected the differentiability of the space-time continuum. It is this indivisible motion that fundamentally supports the qualitative aspect of the world with its time-extents – "buzzing" flies or heron-like flies, or "mellow" violins (Robbins, in press). Secondly, the modulated wave supported by the body/brain is not spatially distinct from the field. The crucial principle of Bergson is this: "*Questions relating to subject and object, to their distinction and their union, must be put in terms of time rather than of space*" (1896/1912, p. 77, emphasis in original). The buzzing fly and the transforming brain are phases of the same dynamically transforming field. At the null scale of time there is no spatial differentiation. But gradually raise the ratio of events in the matter-field to events at the highest scale or level (neural) of the brain and, from a vaguely outlined ensemble of whirling "particles," the form of the fly begins to coalesce, then barely move its wings, then becomes the heron-fly, then becomes the buzzing being of our normal scale. The dynamical state of the brain specifies a four-dimensional extent, a time-scaled subset of the *past* or the past motion of the matter-field; that is, *it is specific to a time-scaled subset of the elementary perception defined over the field.* Symmetrically, it is specific to the possibility of *future* action.

This is Bergson's framework for the relation of sensorimotor contingencies to external field, and therefore the origin of the "external" image; it is how we take "the perceived detail to be out there in the world" (sect. 6.7) The non-differentiable time-motion of this field underlying (scaled) four-dimensional extents is the true support for quality. Within this framework, and implicit in sensorimotor contingencies, is another implication (Robbins 2000; 2001; 2002). If perception is the display of virtual action, it is the display of capability of action (e.g., for the buzzing fly, his wing-beats a-blur, of the modulation of the hand-arm necessary to grasp the fly). But if the dynamics underlying this can be changed – that is, if the chemical velocities underlying this global dynamics are increased – then perception must change. The fly perhaps becomes the heron-like fly precisely because it is a new specification of the possibility of action, perhaps now showing the possibility of removing the fly from the air by his wing tip. This must be so if perception is to be ecologically valid. Albeit unclear practically how today, this is a testable consequence.

An epistemological account of visual consciousness

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Abstract: O'Regan & Noë's (O&N's) explanation of our stream of experience as activities depends on their denial of that palpable, most real aspect of experience: what they call "qualitative experience." Given the ontological primacy of the qualitative givenness of our experience and the complete absence of actions as experiences in our stream of consciousness, though, all such reductionistic attempts must fail.

According to O'Regan & Noë (O&N) (2001), visual awareness (or experience) is due to two processes: first, the brain abstracts laws of sensorimotor contingencies from sensory changes that co-occur with movements, and codes them. One must also exercise mastery of this information or expertly "know all about" (sect. 2.4 of the target article) these contingencies. Second, this knowledge is used for thought or planning, and with this, one becomes aware, or "you see it" (e.g., a color; sect. 2.6). It is important to note that the authors reject the phenomenal or qualitative aspect of experience, arguing that "[visual] qualia are an illusion" (sect. 6.3), and that qualitative experiences are simply "ways of acting. . . . They are things we do" (sect. 6.3). In essence "there is no simple, unanalyzable core of the experience. There are just the different things we do when we [experience]" (sect. 6.4.1). We have three critiques of their proposal.

First, at critical points they are either unclear or inconsistent in describing what experience consists of. For instance, they claim experience consists of many different activities, such as "eye movements, shifts of attention," and "the application of understanding" (sect. 6.4.1), but only one activity, the use of knowledge about sensorimotor contingencies, appears critical (sect. 2.6). In other sections, they equate experience with knowledge ("to experience a red object . . . is to know such things as" sensorimotor contingencies [sects. 6.6 and 6.8]), or knowledge with an activity, ("[seeing red] consists in the (implicit) knowledge associated with seeing redness" [i.e., the laws of sensorimotor contingencies; sect. 6.4.1]). Which of these "things we do" is critical for one to experience? Is experience just activity or is knowledge critical? If knowledge is a critical component of experience, then it is incorrect to state that there are just things we do when we experience unless knowledge is an activity. Since these authors argue against the intuitive understanding of the nature of experience as qualitative, it is critical that they should be clear in their description of their alternative reduction.

Second, and most fundamental, O&N have not provided a compelling argument to reject the existence of phenomenological or qualitative experience. In describing experience in terms of activities, they could argue one of two positions; qualitative experience exists but it is the same thing as activities (the identity argument), or phenomenological experience does not exist and the totality of experience is only activities (the eliminative argument). They argue for the elimination of the reds and qualia of experience, but their argument fails in this rejection of the qualia or red. Consizder their general argument for rejection: (1) vision consists of two processes; (2) if qualitative visual experience is a subset of vision, then experience consists of these processes; and (3) since processes are not qualitative sensory-like states, phenomenological experience must be rejected. Their argument depends on the first premise, that visual experience consists of only these processes. However, they argue only that these processes are involved. The possible existence of these processes, though, does not at all preclude the added existence of a phenomenological or qualitative aspect of experience.

This same basic problem occurs when O&N try to support their argument by demonstrating how experience can be described

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completely in terms of activities or processes, without reference to phenomenological states. In describing the experience of a red wall (sect. 6.4.1), they invite us to "try to describe the experience" and suggest "one thing you might do is direct your attention. . . ." Notice that they have already changed the argument from describing the qualitative aspects of experience to describing the things that you might do in order to have such an experience. In accord with their list of activities, they conclude "there are just the different things we do when we [experience]." Again, the existence of these unseen activities, and the role that they may or may not play in experience, does not in any way preclude the existence or indeed primacy of phenomenological experience itself. In fact, simple observation reveals there is something much more than activities; there is the immediate experience of red itself as qualia. In describing the experience of a red wall, one may say that its color is deep or dark, purplish or like a tomato. A complete description of the experience may occur without any reference to activities one engages in while experiencing. This suggests a fundamental difference between the experience of red and the things we do when we experience red. This invalidates O&N's conclusion that there are only the different things we do when we experience.

Finally, our critique, though largely a demonstration of the inadequacy of their model, fundamentally rests on the undeniable existence, indeed primacy, of qualitative experience. That is, experience clearly consists of qualities such as reds and sounds, but does not clearly consist of things like activities or sets of contingencies – at least not as experienced. We view the issue of qualitative experience as an epistemological problem of the ontological character of experience. Any discussion of this issue must begin with the undeniable existence of qualitative experience, not how qualia are an illusion and that our stream of experience is simply a set of activities or contingencies.

Editors' Note: There is no Authors' Response to this commentary.

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