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A necessary condition for proof of abiotic semiosis

Abstract: This short essay seeks to identify and prevent a pitfall that attends less careful inquiries into “physiosemissis.” It is emphasized that, in order to truly establish the presence of sign-action in the non-living world, all the components of a triadic sign – including the interpretant – would have to be abiotic (that is, not dependent on a living organism). Failure to heed this necessary condition can lead one to hastily confuse a natural sign (like smoke coming from fire) for an instance of abiotic semiosis. A more rigorous and reserved approach to the topic is called for.

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In his *Basics of Semiotics* (1990), John Deely allotted considerable ontological space for “physiosemissis,” that is, sign-action purportedly occurring at the level of purely material interactions. Deely’s programmatic vision, which he never relinquished,¹ has since been tentatively explored by some (e.g., Coletta 2009). Nevertheless, despite enjoying some limited argumentative underpinnings,² commitment to physiosemissis traded (and continues to trade) principally on intuitions – even its detractors frequently rest their case on nothing more than derision. Obviously, it would be nice if, without prejudging its ultimate outcome, the debate could move past this stage.

¹ See Deely (2009: 182–185) for a recent statement.

² Although Deely was prompted to endorse the idea of physiosemissis by his syncretistic study of Charles S. Peirce and John Poinsot (cf. Deely 1990: 87–91), his ambitious promissory note can also be motivated (perhaps more persuasively) by an inference to the best explanation. On this view, a complete absence of semiosis outside the living world would turn out to be more surprising/unlikely than its presence, however minute or sparse, in the non-living world (it is helpful to compare this with the “no-miracles” defense of scientific realism; cf. Smart 1963: 39).

To be sure, the aspiration of augmenting the stores of human knowledge solely by secure increments is chimerical, as the very search for evidence that would corroborate a given tenet must take place in advance of such (potentially unavailable) corroboration. Yet, while a provisional measure of abductive zeal can be conducive to scientific aims, this does not license a departure from the canons of evidence and justification. *Hypo*-theses merit their prefix, and cannot remove those pejorative shackles merely on account of their intuitive attractiveness (nor keep them on forever merely on account of their unattractiveness). With this in mind, I would like to articulate a condition that would need to be met in order to successfully claim to have located an instance of sign-action in the non-living world.

Perhaps the best way to get clear about what physiosemosis *would be* is to identify what it certainly *is not*. Consider, as a foil, the following passage:

Water molecules can interact with each other forming what are known as hydrogen bonds. These are different than the covalent bonds between the atoms of the water molecules themselves; instead these hydrogen bonds are intermolecular interactions between molecules themselves. Each water molecule has the potential of forming four of these hydrogen bonds with four adjacent H₂O molecules. Most of you probably know that water boils at 100 degrees Celsius, but some may not know the exact reason. It is precisely because of these hydrogen bonds between adjacent water molecules that water is able to maintain its liquid state well beyond many other molecules of similar size [like methane] . . . Here we come across my first example of an intermolecular sign relationship. As humans, we can note that water has a high boiling point and in this particular example, water's high boiling point is a sign of the intermolecular reactions occurring between water molecules due to hydrogen bonding. (Newsome 2009: 205)

What is of consequence here is not the rudimentary piece of scientific trivia recounted, but rather the conclusion drawn. It is held that because the macroscopically-ascertainable phenomenon of boiling water is determined by complex microscopic mechanisms, this somehow attests to the existence of an "intermolecular sign relationship." That, as it stands, is an overblown conclusion.³

What would be needed to secure the claim of an abiotic status is some demonstration that the candidate involves an *interpretant* not answerable to or

³ In fairness, the passage quoted was written by a self-acknowledged newcomer to semiotics, and was appropriately qualified. Still, it is symptomatic of a deeply mistaken pattern of reasoning we would do well to identify and avoid.

dependent on any living agency.⁴ Though the topic at hand might impress the uninitiated, the chemical example reported in no way differs from the familiar “smoke signifying the fire.” The events linked are physical – yet one’s taking the former to “stand for” the latter does not bear witness to any “chemiosemiosis.” Why not? Because in the end what does the interpreting is a human agent. For a sign to truly involve an “*intermolecular* sign relationship,” then, one would have to establish that *all* its parts are non-living. The moment Newsome writes that “As *humans*, we can note that . . . water’s high boiling point is a sign of the intermolecular reactions” (2009: 205, emphasis mine), he runs afoul of this pivotal requirement.

Signs never work alone, and interlock in a processual concatenation. Hence, it may be that,

[b]efore there are actually signs, there are signs virtually, that is, there are beings and events so determined by other beings and events that, in their own activity as so determined, they determine yet further series of beings and events in such a way that the last terms in the series represent the first by the mediation of the middle terms. (Deely 1990: 87)

On pain of ascribing their predictive success a miraculous or confabulated basis, scientists who “do” something with natural signs are thus distal links that capitalize on a chain of events that pre-exist them. Consider Boyle’s law, which expresses the precise relationship that obtains between the properties of a gas. It states that the volume of a fixed amount of gas maintained at constant temperature is inversely proportional to the gas pressure. The considerable utility of having made this steady worldly correlation explicit is that it enables the researcher aware of it to infer, on the basis of knowledge of just two variables, what the remaining third is.

Is this proof that sign-action pre-exists the involvement of living entities? As a formula, “Boyle’s law” is without a doubt a sign-vehicle of the lawful correlation which it has as an object, and it routinely generates interpretants in laboratories the world over. That is trivial, and takes us down well-trodden paths. The contentious issue, by contrast, is whether the lawful relation itself – minus the action of human animals – can properly be characterized as “semiotic.”

Chemists are not just benefiting in constructivist fashion from the pioneering work of Robert Boyle; they are also benefiting from the fact that, metaphysically, the behavior of gases manifests a pattern stable enough to allow inductions (cf. Ross 2000). Boyle had to discover (not invent) this pattern. So, in this sense, the

⁴ See Champagne (2009: 158–159) for more on the often misunderstood term-of-art “interpretant.”

relation he latched onto is uncontroversially mind-independent. Yet, however committed one may be to the prior intelligibility of the world, it is fallacious to ascend a modal notch on that basis alone.⁵ It is a truism to say that everything we cognize is cognized, and is thus capped-off by a human interpretation. *Mutatis mutandis*, it is uninformative to assert that the mind-independent relations we uncover (often at great scientific cost) do not depend wholly on our minds. A tenable proof or disproof of abiotic semiosis must avoid resorting to these platitudes.

By design, I have not here proposed a positive account that could satisfactorily do this. Glancing critically at early forays, I have merely endeavored to remove a *non sequitur* liable to obstruct future developments: *for a sign to be truly abiotic, confirmation that a sign-vehicle and object are abiotic does not suffice, as the interpretant which such a pair produces must likewise not depend on a living entity*. So long as the relevant triad has one foot in the more vibrant side of the living/non-living threshold, a more complete scientific account of the underlying physical occurrences will not support the idea of non-living sign-action.

In spite of its modesty, this condition brings a much-needed dose of rigor to the topic at hand. Exploratory work rich in suggestive power should certainly not be discouraged, especially when openly identified as such (e.g., Deely 2001). Still, gambits driven by uncorroborated intuitions will take semiotic inquiry only so far. The foregoing is not meant to settle the controversy over abiotic semiosis, but rather to spur semioticians to pose a clearer, more focused, question and let the facts – not their hopes or prejudices – render the verdict.

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⁵ The crater *can* signify the meteor. This truth can be recast, if one likes, as "The crater signifies the meteor *in potentia*." The slide in surface grammar is permissible. What is *not* permissible is a reification that would then latch onto the apparent actuality of "The crater signifies" while dropping the all-important "*in potentia*" clause. If, in the final analysis, the idea of physiosemiosis rests on nothing more than this parlour trick, then some therapeutic Wittgensteinianism is in order.

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