
LIKELIHOOD OF SOMETHING WORTHWHILE TO BE ADDRESSED EMPIRICALLY

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A descriptive enterprise addressing whatever object of any value takes for granted the occurrence of a durable identity of the object in focus. Description cannot be initiated unless the self-identity of the intended descriptive object is guaranteed in advance. If one attempts to face this issue of description metaphysically, the standard strategy to be adopted in philosophy would be to make an ontological commitment prior to starting up the descriptive enterprise. Nonetheless, one inevitable drawback incurred from adopting an ontological commitment, in one form or another, is that such an endeavor could be equivocal. Concrete particulars as the necessary ingredients of the empirical world are far more specific in the contents of their own identification, compared to the merely panoramic display of ontological being on the level of abstraction.

At this point, one advantage of doing empirical sciences is found within letting the ontological commitment, that is inescapable to any empirical scientist, recede from the front line into the invisible background behind. Empirical sciences may be competent in uncovering the self-identity of a *de novo* object, one by one as devising a specific procedural protocol for enlarging the extent of our sense organ in both the directions toward the micro and the macro. Despite that, the present appraisal of doing empirical sciences comes to face one serious challenge of how could the notion of the self-identity of a material body be envisioned without stepping into the territory of metaphysics.

In particular, one clue for figuring out what the self-identity may look like especially in the organic world is found in the principle of contradiction observed by Aristotle as stating: "It is impossible that the same thing belong and not belong to the same thing at the same time and in the same respect" (Aristotle 1005b19-20).

Its implication is such that it is impossible that any predicate belong and not belong to the same subject at the same time and in the same respect. This original statement on the principle of contradiction is framed in

predicate logic. Accordingly, the capacity of making a decision subjectively on avoiding the contradiction of letting the predicate belong and not belong to the same subject rests upon the subject itself. The present interpretation of the principle of contradiction certainly differs from another one framed in the propositional logic as saying that for any proposition P , the formula $\neg(P \wedge \neg P) \supset \neg P \vee P$ will be satisfied in formal logic. Above all, it is the logician, instead of the subject residing within the very predicate logic, who can objectively make a decision on which is right, either P or its negation $\neg P$, within propositional logic.

What has been revealed in predicate logic is that the subject in predication can maintain its self-identity for exercising the decision on prohibiting the same predicate from belonging to and not belonging to the same subject at the same time. Once one comes to note that each subject in predication is about a concrete particular as a self, the capacity of making decisions can be seen ubiquitous in the empirical world. This observation invites us to view the ubiquity of the self in the empirical domain. One significant stepping stone in this regard is the emergence of self-replication that could have occurred on the thin surface of the planet Earth.

Self-replication assumes the dichotomy of the self-replicating and the self-replicated. Although it may be rather common to apply the same self to both the self-replicating and the self-replicated from a simplistic perspective, this practice can easily become vulnerable to offending against the principle of contradiction. The self-replicated is a negation of the self-replicating. The distinction resides within the difference of the voices between being passive and active. The reaction cycle processing a self-replication is constantly converting a product into a reactant, in which the product is a negation of the reactant. If the reactant is literally identical to the product, the principle of contradiction may be violated in spite of the ubiquity of self-replication in the empirical domain. One likely empirical means for rescuing the principle of contradiction thus comes from the distinction between the class identity and the individual identity of each participating molecule. Even if the molecule as a product and the molecule as a reactant belong to the same class, these two molecules can be different if some of the atomic components of the reactant are exchanged to the different individual components of the same types. Self-replication making the organic, or equivalently, biological world tenable is in the material activity of the exchange of the component elements.

The principle of contradiction functioning as an indispensable regulator for the occurrence of self-replication comes to admit the agential capacity of each subject, appearing there in that it can identify or detect the predicate belonging to it from within. That is to say, each subject can hold its own self-identity for presiding over the act of internal measurement in picking up an appropriate predicate (Matsuno 1989). The subject of predi-

cation appearing in the principle of contradiction is thus the internalist. The material vehicle processing the exchange of the component elements for upholding the principle of contradiction from within thus culminates in the occurrence of self-replication in the empirical world. This perspective makes a marked contrast to another view on the role of the exchange of material as observed by Schrödinger saying:

How does the living organism avoid decay? The obvious answer is: By eating, drinking, breathing and (in the case of plants) assimilating. The technical term is metabolism. The Greek word (*metabollein*) means change or exchange. Exchange of what? Originally the underlying idea is, no doubt, exchange of material. (e.g. the German for metabolism is *Stoffwechsel*.) That the exchange of material should be the essential thing is absurd. Any atom of nitrogen, oxygen, sulphur, etc., is as good as any other of its kind; what could be gained by exchanging them? (Schrödinger 1944).

Although Schrödinger declared that the exchange of material as an essential ingredient of material dynamics is absurd, this dismissal of the exchange of material is based exclusively upon the perspective that the self-identity of a material body must be limited to those of atoms and molecules in isolation as practiced in quantum mechanics. The self-identity of a quantum is anchored at the principle of identity, stating that each thing as the subject is the same as this very thing framed as the predicate. This statement of the principle of identity is however metaphysical in its makeup since the agency recognizing the principle as such is the metaphysician as the externalist, instead of the internalist as in the case of the principle of contradiction. Nonetheless, the physicist recognizing the self-identity of a quantum can dispense with the interference of the metaphysician while being involved in repeating the empirical observation of something eventually called a quantum, as Planck demonstrated as facing concrete particulars specific to the empirical world.

At issue must be how the two principles on identity and on contradiction could be integrated in a coherent manner as facing the one and the same empirical reality. One practical strategy adopted in physics so far for this enterprise as anchoring it at the principle of identity is to shed a legitimate light on the role of inexorable physical laws remaining invariant through a symmetric operation in an abstract space. For instance, laws of motion in classical mechanics remain invariant in any inertial frame whether in the non-relativistic regime or in the relativistic counterpart. Maxwell's equation of electromagnetic field also remains gauge-invariant in the unitary space allowing for those variables to which complex numbers are assigned. The necessary connection to the concrete particular nature of the empirical world as starting from an invariant physical law

available in an abstract space is through additionally imposing specific initial and boundary conditions upon the law itself.

One more strategy anchoring it at the principle of contradiction is to appreciate the occurrence of a material body that could remain robust through the exchange of the component elements. The self-identity of such a material body is certainly weaker than the self-identity of an inexorable physical law in that the robustness to be maintained through the exchange of the component elements cannot remain invariable in itself.

The self-identity of the robustness upon variability is, however, far more practical and empirical compared to another self-identity upon invariability as practiced in physics. The distinction would become most acute and conspicuous when one comes to face the issue of the origin of life on the physical ground.

If one accepts the question of which comes first between self-replication and metabolism, the acceptance of this formulation of the problem would also necessarily take the presence of inexorable physical laws for granted as letting the question of which is first, either self-replication or metabolism, be reduced merely to the contingent matter of implementing the initial and boundary conditions. Anyhow, the present formulation of the problem unquestionably smuggles in the abstract space that can keep inexorable physical laws intact, despite of the fact that the empirical space does not require the abstract space for its own sake. Once this hangover from an overly metaphysical heritage is lifted, the question of which is first, either self-replication or metabolism, would lose its *raison d'être*.

A more modest formulation of the problem would turn out to be how each of self-replication and metabolism could come into being in the empirical world. As a matter of fact, once we pay due attention to the self-identity upon variability that is unique to our empirical world and ourselves, the exchange of material that is a metabolism serves as a precondition for the occurrence of self-replication. The crux is within two steps forward one step back.

REFERENCES

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