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“RATIONALITY: REASONING, INTUITION, RATIONAL SCIENCES”

Human actions in all their appearances are evaluated and assessed as rational or irrational. Communication and speech acts of all kinds are subject to rational evaluation, including everyday thinking and decision-making, scientific research, economic and political behavior, and even love-affairs and sport competitions. Rationality is a normative concept in the sense that it is supposed to provide a standard or criteria to evaluate a piece of reasoning or an instance of decision-making.

The areas to be covered in the 2015 special issue of the journal include but are not limited to the following sub-topics:

- a) Rationality, reasoning and intuitions;
- b) Rational bases of cognition;
- c) Rationality in mathematics;

- d) Rationality in social sciences;
- e) Empirical work on rationality in cognitive science and its philosophical relevance.

Through this issue we hope to contribute to the following agenda:

- a) To enhance the understanding of the rational foundations of reasoning (acquisition and use of basic logical and mathematical concepts; understanding, possession conditions and use of basic logical rules),
- b) To offer an account of rationality demands in communication,
- c) To determine the relation between individual rationality and the evolution of social institutions.

The Editorial Board
of *Balkan Journal of Philosophy*

Articles

Invited paper

RATIONALITY, EMPIRICAL ONTOLOGY, REFLEXIVITY, AND ONTOLOGICAL DIFFERENCE

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Abstract:

While supporting the anti-foundational ontological turn in science and technology studies, the author criticizes the tendency towards the radical empiricization of empirical ontology. The article discusses two crucial arguments against this tendency. On the cognitivist argument, empirical immediacy is inevitably shaped and mediated by non-empirical assumptions. According to the hermeneutic argument—which is of great greater importance—any empirically immediate state of affairs is the upshot of actualizing possibilities projected by interrelated practices upon horizons of practical existence. Thus, what is given as empirical immediacy is ineluctably “produced” within the potentiality for practical being. Following this argument, a non-empirical extension of empirical ontology is suggested. The starting-point of this extension is the integration of radical reflexivity into ethnographic descriptions of multiple realities. A further step consists in the introduction of double hermeneutics to studies of empirical ontology. Finally, the significance of ontological difference for these studies comes under scrutiny.

Key words: radical reflexivity, endogenous reflexivity, interrelatedness of practices, double hermeneutics, fore-structuring, ontological difference.

1. Introduction

The temporal and spatial dimensions of local rational orders of social activities is a persistent theme in all programs that aim at making ideas of hermeneutic phenomenology useful for empirical social studies. For a long time the paradigm of

perspectivalism has dominated attempts to introduce phenomenological concepts of rationality to these studies. Alfred Schütz's approach to the intersubjective constitution of meaningful realities is a case in point. Yet perspectivalism has proven to have significant flaws, and it has been gradually overcome in the last four decades. It became clear that the local rational orders—whether they are homogeneous orders like those in a scientific laboratory, a factory, a school, a small-scale industry, a religious community, an artistic group, different kinds of “invisible colleges,” etc.; or heterogeneous orders like those created by the shared everyday life of a small urban community or a relatively isolated emigrant community composed of members of different social origins—are not outcomes of a progressive exchange of agents' perspectives within the network of social interaction. The conviction that the societal topos of interactive inter-subjectivity does not have self-sufficient being has gradually gained currency. Roughly, the intersubjective rationality (as manifested in a particular ethos) “takes place” within the horizons in which the interactive agents are “always already” thrown. But how is this “place” to be approached and scrutinized? No doubt it is not a fixed site that can be physically localized.

The intersubjective rationality of a local social order takes place within an ever-changing horizon of possibilities projected by the variable interrelatedness of the practices which constitute that order. This horizon has a character of trans-subjectivity since it constantly transcends the subjectivity of each particular agent. (Here by “subjectivity” I mean the manifold of an agent's

cognitive, emotive, and volitional characteristics, which become socially expressed within the respective local order.) On this formulation, all contextual inter-subjectivity of interactive relations that express agents' subjectivities are also transcended. Thus, intersubjective rationality takes place within a trans-subjective (constantly changing) horizon via the choices between possibilities which the agents make. (Accordingly, the "place" of this rationality is not an "essence" hidden behind or beyond the choices.) It is these important choices that lead to changes in the established configurations of interrelated practices, thereby provoking a "shifting" and "sedimentation" of old possibilities on the one hand, and the laying open new possibilities on the other. The "place" which the intersubjective rationality occupies—or, more accurately, *creates*—is the processuality of such choices which never become pure presences. Seen from a different angle, the "place" in which both the agents' activities and the local order maintained by these activities (including the network of interactions) attain rationality is in the mediation between contextually configured practices and deferring horizons of possibilities. On this account, the spatial-temporal phenomenon which one ought to address in studying empirically the ongoing constitution of rationally organized local social orders is the intersubjective-rationality-within-its-trans-subjective-horizon. It is this kind of rationality that ontologically "precedes" the codices of normative rationality, or the teleological rationality of agents' comportments, or the rationality of various types of action, or social rationality as determined by a cultural model of rationalization.

In the remainder of this article I will probe the complementarity of two approaches designed to tackle the phenomenon being mentioned. The first approach is highly successful in surmounting perspectivalism and its deficiencies, yet it is too radical in its ambition to entirely depict the emerging rationality of local social orders in an empirical manner. In drawing on the distinction between factuality and facticity, I appeal to a second approach that takes into consideration (what Melvin Pollner calls) "referential reflexivity" in studying forms of endogenous reflexivity and rationality.

To begin with, a tendency toward ontology has recently grown in popularity in science and technology studies. It is a tendency that tries to extend the ethnographic description of social entities and states of affairs (like the disease of

atherosclerosis and the reality of fish-farming) as they are placed and enacted in complex milieus of artifacts, technological devices, and settings of equipment. After having been enacted, the entity/state appears to have a multiplied being, without becoming fragmented into many. The ontic diversity concerns the manifold of the entity/state's modes of existence. The enactment occupies the central position in this extension since it creates the dynamic unity of the entities and the milieus in which they circulate. It is precisely the ecstatic nature of enactment that escapes a purely ethnographic description, and requires an empirical ontology of the whole complexity of social-entities-enacted-in-milieus-of-artifacts. The very complexity has its being in social practices. It is at the same time a being projected upon possibilities that are generated by the enactment of entities in those practices. In undoing any strong demarcation between humans and nonhumans in the complexity of enacted entities within particular settings of practices, studies of empirical ontology present a new development in the actor-network theory.

While welcoming the tendency towards empirical ontology in STS as part and parcel of the post-metaphysical turn in social theory, in the next section I will oppose the impetus to reduce the ontology of "situated transcendence" to empirical ontology. The claim will begin to emerge that a kind of hermeneutic (non-empirical) ontological reflection has to complement studies of empirical ontology. Roughly, the paper unfolds the thesis that the unavoidability of "ontological difference" (or, the difference between the empirical description of multiple entities in interrelated practices and the hermeneutic analysis of the situated constitution of meaning) provides a crucial argument against the full-fledged empiricization of ontology. Stated in this general form, the thesis will be advocated by elaborating on Melvin Pollner's concept of radical reflexivity in a manner that will turn one's attention to a version of the methodology of double hermeneutics. It is a methodology of reflecting upon multiple entities and local interactive orders by taking into consideration ontological difference. The conjugation of endogenous reflexivity (generated by a network of humans and nonhumans) and the researcher's radical reflexivity requires more than ontic description. This conjugation, recast in terms of double hermeneutics, allows one to make sense of the local interactive orders in their potentiality for being.

2. Non-empirical assumptions in the radical empiricization of ontology

It is a central claim of the philosophy which grounds the studies of empirical ontology that not only particular entities and state of affairs, but entire realities are enacted in practices (Law and Lien 2013). The multiplying reality of the farmed Atlantic salmon as a reality “without a single order” within fish-farming practices is at issue in Law and Lien’s case study. Each practice is defined as web of relations (“choreography”) among human and nonhumans. What becomes enacted acquires the status of being “almost but not quite created.” The task consists in unfolding an ontology relevant to the domain of fish-farming practices. This should be an empirical ontology of “contingent orders” that involve ordering processes, disorders, and “unknowable fluidities.” Thus, the case study of these authors shows what the farmed Atlantic salmon comes to be in multiple, fluid, and indeterminate configurations of practices. At stake is the multiplicity of a biological-species-in-different-human-practices—a multiplicity in a situation that is precarious and uncertain. The texture of practices manages to draw a demarcation between salmon and humans, but this demarcation is not to be recast in naturalist-objectivist terms. In their inextricable linkage with humans, the farmed Atlantic salmon are ontologically defined as “Other to the human.” But this kind of salmon is at the same time Other to its “wild cousins” in the Atlantic ocean. Human-salmon practices are practices of an ongoing “Othering.” The empirical ontology of this multiple and “almost created” (but nonetheless natural) creature—which however strongly it is enacted in practices remains biologically typified by a dorsal adipose fin posterior to the main dorsal fin and by several other genetic, biochemical, ethological, physiological, anatomical, etc. traits—is also an ontology of a process of “artification.” It is an artification within practices that does not have a natural state (as a point of departure) or a state of something completely constructed (as a final point). This is rather a process that constantly runs between hybrid (natural-artificial) states. I will return to Law and Lien’s ontology in another context of discussion.

Empirical ontology is an initiative that promotes a way out of relativist-epistemological perspectivalism. By putting all participants in a system of orchestrated practices on a par, the methodology of perspectivalism dissects each particular entity enacted in practices, thereby representing it as a

manifold of separate objects whose existences depend on the practitioners/participants’ standpoints. By contrast, empirical ontology offers a holist approach to practices, without assuming a grounding order. The interrelatedness of practices has an ontic priority over the practitioners’ positions which allegedly controls and warrants the practical order. Whereas perspectivalism relativizes and pluralizes the domain of configured practices, empirical ontology tries to retain the unity of the network in which the enacted entities become multiple with regard to their modes of existence. An entity enacted in this network does not get dissected and scattered into perspective-dependent objects. It rather gets multiplied and stratified in its own being. Put differently, the enacted item becomes a multiple entity without losing its ontic identity. The task of empirical ontology is to grasp the entity’s contextually scattered existence within the network of practices. Accordingly, the focus on a particular practice is limited to the question of how the practice weaves its relations with other practices whereby the interrelatedness enacts entities. By implication, the enacted entities have their modes of existence in overlapping practices. To sum up, the studies of empirical ontology focus on interrelated practices in flux that only allow the existence(s) of entities-enacted-in-practices. Prominent champions of the ontological turn in STS argue that their approach provides resources for investigating how technoscientific practices change the world(s) materially, socially, morally, and politically. Following this approach, one scrutinizes the ways in which science and technology intervene in the world(s) (Marres 2013, 422).

Empirical ontology undoubtedly goes hand in hand with many versions of constructivism, but it is much more than a mere supplement to social constructivism. In his review of Mol (2002), Ashmore (2005) argues that exploring the ways of cognitive construction is still an epistemological enterprise, whereas practical intervention in the world is something that belongs to the investigatory purview of ontology.¹ Yet empirical-ontological

¹ Ashmore also stresses that Mol’s ontological approach to practices should not be read as endorsing the search for “Ontics, designed and destined to replace the tired old routines of Epistemics” (Ashmore 2005, 829). On my reading, the champions of empirical ontology are not looking for a confrontation with epistemological programs. Yet, in contrast to older supporters of science-as-practice, they are guided by the view that there is no hypostatized body of knowledge separable from epistemic

studies do not amount to investigating interventions in worlds already made. At stake are also issues like the “degrees of alterity” of the worlds which science and technology bring into being (Woolgar and Lezaun 2013, 323). In this regard, the ontological approach in STS suggests ways of studying “multiple entities” that are constantly *in statu nascendi*. These entities engender in their turn “multiple realities” that are also emerging *political realities*. More specifically, the ways in which various types of practices enact entities differently create different micro-political regimes of interaction within the practices’ networks (Brives 2013). The shift from (representational and/or normative) epistemology to ontology parallels the transition from science-as-knowledge to science-as-practice. Yet the ontological turn is by no means to be restricted to a moment of the praxeological turn. The ontological approach to practices and enacted entities has a lot of distinctive features that make it unique within the family of science-as-practice approaches. Let me briefly sketch out the most important of these features.

Students of empirical ontologies prefer to use the plural not only for realities and worlds. They speak of “ontologies” because they hold that each relatively autonomous body of orchestrated and concerted practices that enacts entities *sui generis* deserves its own “ontological model.” (Here “model” is to be understood not as a theoretical representation, but as the outcome of a thick description that includes intervention in what gets described.) Thus, there is a growing diversification of ontologies in science and technology studies. The rationale behind the impetus of this diversification might also be formulated as follows: different enactments of an object in different configurations of practices entail different “ontological models” of it. Thus considered, a particular empirical ontology

practices. The latter, however, are inextricably implicated in the multiple realities that have to be studied ontologically. Thus, there is no knowledge that cannot be treated in terms of empirical ontology (in particular, the units of knowledge are no more than specific “multiple entities”), and, at the same time, there is no knowledge that can only be approached/analyzed from an epistemological point of view. The champions of empirical ontology manage to overcome the traditional opposition between theory and practice. When Ashmore appeals in his review for a peace between Epistemics (which is dealing with the hot side of science, with novelty and controversy) and Ontics, he still commits to the traditional opposition, thereby adhering to a sort of Cartesian presupposition.

seems essentially akin to a description of (what Heidegger calls) a “nexus of equipment” (*Zeugzusammenhang*).

Since orchestrated practices generate orders, the ontological approach in STS avoids assuming a grounding order lying behind the particular orchestrations of practices and enactments of entities. The avowal of the insurmountable diversity of orders expresses the commitment of STS (and part of the feminist critique of science) to post-metaphysical initiatives and agendas. Law and Lien (2013) demonstrate cogently the way in which the ontological approach undoes the very idea of a grounding order. These authors insist on a clear distinction between the question of what exists through enactment (the question of empirical ontology) and the question of the general ordering of the cosmos. Focusing on practices rather than on stable social structures implies a full-fledged concentration on the former question. On a further claim, there are no “orders in themselves,” but only orders generated by practices. Accordingly, ontological questions of ordering (creation of contingent orders) are detached from any kind of global ontology of the world-as-presence. The idea of “cosmos” (if any) turns into a Whiteheadian totality of ordering processes.

Law and Lien provide a nice non-foundationalist picture of the levels of practices’ interrelatedness. This picture is obtained by unpacking the aforementioned claim that there is no ordered ground separate from practices and their relations. All kinds of ordering in a domain of interrelated practices are provisional, expressing specific effects of their interrelatedness. Entities are meaningfully reshaped as a consequence of changing choreographies as “nexuses of equipment.” No entity can have its own identity behind the interrelated practices. The creation of a “choreography” in which a synergy between humans and nonhumans takes place is the first level addressed by the empirical studies of ontology. A well-functioning choreography is one in which the involvements of entities in practices maintain the domain’s persistent unity. The enacted entities are pieces of equipment indispensable for the domain’s functionality. Within a well-functioning choreography, entities are characterized by their serviceability, conduciveness, usability, and manipulability.

A second move consists in exploring “precarious choreographies” in which the

interrelatedness of practices gets disturbed. A precarious choreography might, for instance, arise from the maladjustment of an entity (as a piece of equipment) to the operative configuration of practices. Entities become dysfunctional in such choreographies. But the most important move is the thick description of the “textures of ordering practices.” A texture draws, as it were, a demarcation between artifacts (entities enacted in practices) and “natural objects.” The ontological study of a texture should unveil the hinterland of invisible practices (and invisible relations) that make alleged natural objects artifacts by assigning to them a status of “actants” playing normative roles (Law and Lien 2013, 369–371). In the texture, there are always “practices of Othering” that bring the (already discussed) artification into being. What is more important, however, is that it stops being a purely empirical ontology of a domain in its actual presence. It describes practices and enacted entities with regard to the possibilities of transforming natural objects into artifacts. Accordingly, it is also an ontology of what has only an “absent presence,” or only a potentiality-for-being.

Anticipating my further discussion in the next section, I would say that the difference between “choreographies” and “textures” tentatively indicates the ontological difference. More specifically, I tend to think that the distinction between a domain-as-a-diversity-of-choreographies (the actual and empirically given “nexuses of equipment”) and a domain-as-a-texture (the potentiality for artification) corresponds to Heidegger’s distinction between the (ontic) “work-world” and the (ontological) “worldhood” (Heidegger 1962, 95–102). Choreographies are present states that can be studied empirically (in an ontic manner), while the study of a texture should involve an (ontological) reflection upon the possibilities of “Othering” that arise out of the interrelatedness of practices. The “worldhood” is distinguished by continuity (continuous constitution of meaning and meaningful articulation of a domain) whereas the “work-world” is a discrete concatenation and multiplication of practices and entities.

Latour’s recent concept of the “modes of existence” is intended, on my reading, to suggest a unified description of the “work-world” and the “worldhood.” Approaching the plurality of modes of being, Latour keeps in sight a concept of experience that takes into consideration the horizons of

possibilities. What becomes experienced is “always already” projected upon such horizons. The realities of human-nonhuman practices (as work-worlds) result from the ongoing appropriation of possibilities. The complementary unity of horizon and constructed reality (as actualized possibilities) would only allow one a description of the modes of existence beyond the “prison of epistemological divisions” (Latour 2013, 184–185).

One cannot unpack empirical ontology without a method, and the ethnographic method of thick description proves to be the most preferable one for doing so. On this method, the way to develop empirical ontology is to scrutinize the practices involved in the making of a relatively autonomous domain. The best case in point is Annemarie Mol’s ethnography of (the domain of) hospital Z, as this descriptive work is entangled with another one, namely “ethnography of atherosclerosis.” The ontological vision of the multiple reality is achieved by an ethnographic description of how the enacted entities (a disease in the first place) become a part of what is done within the interrelatedness of practices. (The ongoing interplay of “disease” and “illness” also plays an important role in this ethnographic scenario.) The description in question ought to be carried out in a manner that would prevent one from admitting the existence of passive objects “in the middle” of the interrelated practices, “waiting to be seen from the point of view of seemingly endless series of perspectives” (Mol 2002, 5). The body, the patient, the doctor, the technician, and the technology (among many other entities) are constantly reshaped and meaningfully re-constituted. The changing configurations of practices (and not the particular standpoints of the participants) are solely responsible for objects’ coming into being and disappearance. (This is also Mol’s argument for the irreducibility/irreplaceability of the ontological approach to/by traditional SSK constructivist-relativist-epistemological approaches.)

Again, the objects do not become fragmented, but multiplied, hanging together in various ways. By implication, the changing configurations of practices constitute ontic multiplications. Ethnographic thick description opens the avenue to unfolding the ontologies of objects’ manipulation-in-practices. This description is not only a method, but also an act of integration into what gets described. In this regard, Mol spells out the specificity of the ethnographic description’s normativity. At issue is the question of how the ethnographer should

intervene in the texture of practices in order to disclose the being (of multiple realities) which becomes continuously constituted. Important here is what Mol categorizes as a “third step” in the ethnographic description—the step of transforming this description into an ontology of practical constitution of meaningful entities. In performing this step, one realizes that creating an ontology of a particular multiple reality is a part of the ontic-ethnographic description of practices one is engaged with. Phrased differently, distancing from disembodied contemplation requires that the researcher’s descriptive practices ought to become a particular focus point of ontic description. Unfolding empirical ontology is first and foremost a reflexive participation in the described reality (Mol 2002, 153).² The ontic study of the multiple entity of atherosclerosis as it is placed in the practices taking place in hospital Z has much to do with the distinction between knowing in medicine (about disease) and knowing about medicine (which deals with the aetiology of illness). This is not an epistemic but an ontic distinction (i.e. a distinction between two kinds of practices taking place in the whole orchestration of the hospital’s practices). If I am correct in my reading of Mol’s study, the researcher might manage to move successfully between “knowing in” and “knowing about” only by means of her reflexive participation in the multiple reality. This conclusion is closely related to issues of radical reflexivity that I will discuss later.

No doubt ethnographic thick description dominates the landscape of empirical ontology. Yet there is also another methodological tendency in the ontic studies typically advocated by Latour. This tendency is inspired by the ontological relevance of ethnomethodological description. The nexus between ethno-methods and life-world’s orders implies an ontic dimension of the descriptive work. However, this dimension is by no means amenable to scrutiny in the very process of ethnomethodological description. Rather, it remains hidden in this

process.³ For Garfinkel’s followers, nothing in a social world can be taken for granted as a de-contextualized presence-at-hand. All entities get described as contextually accomplished entities. In other words, the description prevents one from hypostatizing objects. *Prima facie* there is no room for ontology (in the traditional, more or less metaphysical, sense) when one is entirely dealing with lived, immediate, unmediated, and congregational practices. There is no “ontological residue” that escapes the immediacy of ethnomethodological description. However, studying the ways in which actors produce orders and manage settings of their everyday activities amounts to investigating the modes of being in everyday life. This is why the description of actors’ endogenous methods of creating life-worlds might lead to ontologies of everydayness.

Two modifications/extensions of this description are of crucial importance for the passage to empirical ontology (and, as I will show later, to non-empirical ontology as well). First, one has to undertake a step beyond the level of “irremediable indexicality” on whose primacy the ethnomethodologists insist. Second, the capability of producing (normative) orders is to be ascribed not only to reflexive actors, but to all “actants” (humans and nonhumans). Melvin Pollner’s (1991) integration of “radical reflexivity” into ethnomethodology allows one to carry out both extensions. Following Garfinkel’s tenet that social norms are not imposed factors that guide, determine, regulate, or cause social conduct in pre-defined scenes of action, Pollner suggests a detailed analysis of the reflexive accountability of action. He makes the case that the study of this accountability (brought into being by actors’ endogenous reflexivity) depends on the researcher’s radical reflexivity. It is this radical reflexivity that engenders critical self-questioning and an appreciation of the inventory (presuppositions, attitudes, concepts, devices, techniques, theoretical resources, and methods) of inquiry. Referentially reflexive appreciation of the ethnomethodological work is “radicalized when the

² The moment of empathy in this reflexive participation is not to be underestimated. Against the background of Mol’s way of distinguishing between disease and illness, one must say that the more the researcher involves her own epistemic practices in the scenario of ontic-ethnographic description, the more effectively she is able to understand the ways of “living with disease,” i.e. the particular illness as a psychosocial phenomenon (as opposed to disease as an object of biomedicine).

³ To be sure, in the tradition of ethnomethodology there are several interesting attempts at making the ontological dimension explicit. I will mention only Eric Livingston’s ontological approach to mathematical work’s life-world. However, such attempts have always been met with skepticism by adherents to tradition who argue that engagement with ontology would transform ethnomethodological description into interpretative theorizing, thereby restoring a sort of theoretical essentialism (Ginev 2013a).

appreciator is included within the scope of reflexivity, i.e., when the formulation of reflexivity—as well as every other feature of analysis—is appreciated as an endogenous achievement” (Pollner 1991, 372).

As a corollary to Pollner’s considerations, the more intensive the preoccupation with radical reflexivity, the more elaborate the ethnomethodological description. By problematizing her own inventory, the researcher more and more ceases to look at actors’ normative orders and life-worlds as something empirically given, and begins to scrutinize them as particular actualizations of possibilities that remain in horizons of still-not-appropriated possibilities. This is why she reads the empirically actualized orders as open to further changes that might come into being by the appropriation of new possibilities. Instead of being apprehended as empirically given actualities, orders become regarded as “inscribed” on horizons of possibilities.

On another motif, radical reflexivity calls into question the immediate actuality given in ethnomethodological description, since it casts doubts on the validity of “intuitions and criteria” concerning empirical immediacy. In exercising this kind of reflexivity, one brings to naught any uncritically accepted entity or state as “actually given,” and attention is drawn to the ongoing constitution of what allegedly exists as empirically given. The (hermeneutic) analysis of this constitution begins to complement the empirical description, and to unveil the “empirically given” as mediated by contextualized practices. As a consequence, one begins to approach actors’ endogenous reflexivity with regard to its potentiality to constitute a meaningful reality. The potentiality for constitution is not externally (explanatory) added to what is actually present, but revealed as inherently operating in the interrelatedness of practices which are ontologically studied. Accordingly, the first step I indicated above is put into effect: Ethnomethodological description is extended in a manner that allows one to go beyond “irremediable indexicality” in order to look for an ontology of everydayness (constituted meaningfully through endogenous reflexivity). Intensifying the preoccupation with radical reflexivity is also a prerequisite for making the second step. The researcher begins to realize that the physicality of nonhumans involved in humans’ action and interaction participates in the constitution of orders and life-words as well. The capability to

put norms into effect is to be assigned not only to the actors, but to all “actants” (in Latour’s Greimasian, semiotic sense).

The question I discussed in the foregoing considerations can be also formulated as follows: Are the contingent orders of multiple entities (and the realities of enacting practices) characterized by an actual being in itself, or they are rather distinguished by a potentiality for being? To be sure, one might cite evidence for the claim that the new studies of ontology dispense with the concept of “being’s actual presence.” Thus, the champions of empirical ontology are interested in unveiling worlds and realities in the making. Empirical studies of ontology are looking for how entities come to be in relational, fluid, and more or less indeterminate practical modes of being-in-the-world (or “modes of existence”). Despite this evidence, however, there are two crucial arguments (an epistemological and a hermeneutic one) that (purely) empirical ontology cannot avoid a hypostatization of the actual being of what it deals with. On the epistemological argument, empirical immediacy is inevitably shaped by non-empirical assumptions (or “prejudices”). Thus, empirical immediacy is always mediated by such assumptions. According to the hermeneutic argument, any empirically immediate state of affairs is the upshot of actualizing possibilities projected by interrelated practices upon horizons of practical existence. Thus, the “actually given” as empirical immediacy is ineluctably “produced” within the potentiality of existence.

It is my contention that studies of empirical ontology do not have the resources to deal properly with these two arguments. I am not going to elaborate on the critical consequences following from the arguments. Let me only tentatively underscore the following point: Regardless of how strong the stress may be on processual ordering, the search for a radical “empiricization” of ontology rehabilitates the priority of actuality over potentiality, as this priority is launched by “metaphysics of presence.” It is impossible—so the epistemological argument goes—to have an empirical description without presupposing an epistemic-representational attitude, and accordingly, to restrict the research work to dealing with an actual presence. (Thus, though representational epistemology has been solemnly banished, the epistemic representation of what is actual comes through a backdoor in each program that struggles for an “empiricization without remainder.” This is

true even when epistemic representation gets achieved by means of “practical intervention.”⁴ The abovementioned attitude inevitably places emphasis upon what gets actually represented regardless of whether the latter is a given (stable and static) state or processes of ordering. All kinds of empirical investigations are epistemologically doomed to be committed to thematizing actualities. This is why there is no room in a purely empirical-ontological study for radical reflexivity that might call into question all empirical immediacy of what gets described.

This criticism poses the question as to whether it is even possible to address the task of empirical ontology without committing to a version of (non-empirical) constitutional analysis of meaning (in the sense of the phenomenological tradition). No doubt, the empirical stance in doing ontology ought to be reflexively enlightened about its own non-empirical assumptions that “make possible” the empirical immediacy of each particular ontological study. In a reflexive manner again, these assumptions have to be taken into consideration in constructing empirical ontology. Pollner’s radical reflexivity is to be implemented into the non-empirical (epistemological) assumptions of empirical ontology as well. Yet in what follows, I will pay attention exclusively to the hermeneutic argument, leaving aside the meta-epistemological critique of the anti-epistemological position held by the students of empirical ontology.⁵ In the perspective of this argument, radical reflexivity provides the ability to scrutinize aspects of the constitution of meaning (as an ontological issue) which are not amenable to immediate empirical study. In enabling one to integrate an interpretative approach into the situated constitution of meaning in the empirical description of a multiple reality—so my argument goes—radical reflexivity

paves the way for having recourse to ontological difference in studies of empirical ontology.

3. Specifying the idea of ontological difference with regard to an extended version of empirical ontology

A tendency to internally critique radical empiricization already exists in the tradition of studies of empirical ontology. Let me briefly turn to a prominent example that illustrates this tendency. In an illuminating study, Noortje Marres (2013) introduces the interesting distinction between empirical and experimental ontology. On her account, empirical ontology deals with transformations of entities taking place in a domain where practical, technological, and scientific kinds of experience merge, whereby the transformations might produce political effects. The circulation of power accompanying these transformations is at issue in empirical ontology. Nonetheless, this kind of ontology is still committed to the classical (human-centered) concept of politics. By contrast, experimental ontology follows the tenets of actor-network theory, and ascribes moral and political capacities to nonhumans. This program goes beyond the empirical studies of ontology in equipping (in a more radical fashion) nonhumans and environments with normative features (Marres and Lezaun, 2011). On experimental ontology, politics exists as a leeway of possible normative engagements. On another formulation, politics is projected upon a horizon of possible accomplishments that can come into being through the deployment of devices, objects, and settings. Marres’s program has an experimental character because it explores the possible interventions in the world (and their political consequences) in terms of “experiments with the world.” The outcome of such experiments consists in getting the political profiles of various (actual and potential) configurations of practices. In this regard, experimental ontology means the ontology of a domain as a leeway of its possible states.⁶

⁴ Notoriously, Hacking’s epistemology puts much emphasis upon the contradistinction between representing and intervening. In fact, however, being still committed to the primacy of the subject-object cut, this epistemology only makes intervening a privileged method of epistemic representation.

⁵ I am using the expression “meta-epistemological critique” in order to underline that this critique is not inspired by the search for an epistemological alternative to empirical ontology. The aim is rather to uncover (by implementing reflexive-epistemological tactics) the “bad epistemology” tacitly involved in those versions of empirical ontology which insist on “empiricization without remainder.”

⁶ In (post-metaphysical) political philosophy one introduces the distinction between politics (*la politique*) and the political (*le politique*). The latter refers to a post-ideological (beyond the traditional Left and the traditional Right) constitution of political topics within the multiplicity of social practices, while the former is reserved for the practices of conventional politics (Marchart 2007, 156). The political implications of Marres’s experimental ontology are much closer to the political than to politics. More generally, the ontological tradition in STS tends to

Furthermore, the “ontologization of politics” in terms of experimental ontology characterizes politics itself in its potentiality, i.e. not in its empirical stability but in terms of the ongoing actualization of possibilities. There is always an empirically untranslatable (or, a trans-empirical) moment inherent in this characterization. With regard to this moment, Marres insists on overcoming the distinction between constituted and constituting ontologies. The activation of possible accomplishments affects the ways in which nonhumans exert influence over existing orders and regimes of power, thereby playing (new) political roles. Accordingly, experimental ontology offers a distinctive way to make sense of nonhumans enacted in practices in terms of “political entities.” The political contributions of nonhumans are to be located on the constituting side. The politics of nonhumans depends entirely on how projected possibilities will be appropriated (not by humans, but by trans-human interrelatedness of practices) in the course of articulating a particular domain as an institutionalized network of human-nonhuman modes of existence.⁷ In this regard, Woolgar and Lezaun spell out the view that ontic studies of the constitution of multiple realities necessitate (or enable) a “new form of political normativity.” The way in which they suggest to “rethink politics through ontology” leads to a concept of political normativity predicated on the potentiality for being of the political. More specifically, they stress the diversity of possible trajectories of “ontological politics” engendered by enactments of multiple

treat (with good arguments) the institutionalized political power as not an ontologically primordial force. According to several authors, this power gets constituted within the trans-subjectivity of being-involved-in-practices. Accordingly, politics is about relations between statuses and power, whereas the political refers to “ontological politics” (Woolgar and Lezaun 2013) as it is put into play by human and nonhuman accomplishments within orchestrated practices.

⁷ As I pointed out, Marres’s position is by no means an exception. As a rule, empirical studies of ontology tacitly admit a difference between ontic description and ontological reflection. Mol is after the difference between the ethnographic description of the “multiple body” (and other multiple entities) and the constitution of multiplicity. She makes the case that if one begins to study the interferences between the enactments of multiple entities (such as atherosclerosis and sex difference), then the complexities start to grow exponentially (Mol 2002, 151). The growth of complexity is precisely the theme of ontological reflection.

entities. By implication, the possible “political constitution of humans and non-humans is in the very constitution of these entities in those terms (human and non-human)” (Woolgar and Lezaun 2013, 334).

The program of experimental ontology as exposed by Marres, however, seems to be underdeveloped in one respect. It does not take into account the endogenous reflexivity generated by orchestrated practices in which nonhumans get enacted. In saying this, I take up the motifs of reflexivity as they were discussed in the preceding section. A possible reason for this deficiency lies in the assumption that by addressing endogenous reflexivity one would rehabilitate the human actors’ privileged position. Yet this assumption ceases to be valid if one proceeds to not restrict endogenous reflexivity to the human actors’ reflexivity. Granted that it is engendered by a whole domain of interrelated practices, but endogenous reflexivity hinges not only on humans’ self-interpretation. It proves to be essentially caused by the nonhumans’ involvements and enactments as well. In other words, endogenous reflexivity refers to two different but intertwined things: the actors’ cognitive capability of reflexive accountability (in the sense in which ethnomethodologists oppose the view of social actors as “judgmental dopes”) and the reflexive properties brought into play by the interrelatedness of practices. An illustration of how these two dimensions of endogenous reflexivity complement each other is the change of the normative design of practices’ interrelatedness accomplished at once “behind practitioners’ backs” and through practitioners’ self-interpretative control. Only by having recourse to endogenous reflexivity—so the argument for supplementing Marres’s experimental ontology goes—is one able to ascribe normative (moral and political) capacities to nonhumans. In attributing reflexivity to the whole being-involved-in-practices that constantly creates an adjustable and regulable order, one takes an important step in introducing ontological difference into the interpretative study of entities’ enactments in practices.⁸

At this point, one should appeal again to Pollner’s radical reflexivity. To reiterate, the more one intensifies this reflexivity, the more one reflects upon the domain of human-nonhuman practices in

⁸ For the distinction between two kinds of endogenous reflexivity ascribed accordingly to actors and the accountability embedded in action, see Czyzewski (1994).

its potentiality for being. As a consequence, one is no longer inclined to admit that the present situatedness of the entities undergoing multiplication is the only empirically possible state of affairs. In the perspective of radical reflexivity, the particular practices and entities are not only situated in the actual (empirically given) configurations of practices, but in horizons of possibilities as well. These horizons are not to be disentangled from the mode of being-involved-in-practices. Radical reflexivity shows that what gets situated (enacted and multiplied) in practices is constantly transcended by a horizon of possibilities. Only by ignoring this transcendence brought into being by the interplay of practices and possibilities can one (uncritically) accept the empirical immediacy of what gets enacted as a multiple entity/reality. The horizon remains finite in each particular configuration of practices (there is a finite number of possibilities that can be appropriated in/by such a configuration), but with regard to the infinity of possible configurations of practices the horizon is inexhaustible. By implication, the multiple entities and realities addressed by the studies of empirical ontology are constantly in a state of situated transcendence. Approaching this state requires (non-empirical) ontological reflection.⁹

I will call “double hermeneutics” the way in which one relates radical reflexivity to the search for unveiling endogenous reflexivity as embodied in the interrelatedness of practices one is exploring. In elaborating on this relation, one is guided by the intention to reveal the potentiality for being (and accordingly, the ongoing situated transcendence) of the multiple reality constituted by (and within) this interrelatedness. Thus considered, double hermeneutics is a methodological strategy for doing justice to the ontological difference in the ontic study of multiple entities enacted in practices.

⁹ In the Heideggerian tradition of hermeneutic phenomenology, empirical ontology (i.e. studies of domains’ ontic structures) is dichotomously opposed to “transcendental ontology” (existential hermeneutics of the meaning of being). It is the methodology of double hermeneutics that manages to overcome this dichotomous opposition. Regardless of how significant the difference is, there is no cleavage between both types of ontology. Rather, both types work in concert. The unfolding of an interpretative description (and narrative) of multiple entities enacted in a multiple reality of concerted practices requires a cooperation between empirical studies of ontic orders in the making and ontological reflections about the integrity of a specific mode of being-in-the-world (Ginev 2011, 37-51).

Double hermeneutics consists of ontological reflection and ontic-interpretative description.¹⁰ The reflection upon situated transcendence which is required to reveal the constitution of multiple entities in their potentiality (i.e. as embedded in horizons of possibilities) is an ontological reflection that ineluctably makes use of transcendental arguments. By contrast, an ontic-interpretative (ethnographic or ethnomethodological) description of how these entities circulate in changing configurations of practices is an empirical inquiry. Methodologically, double hermeneutics refers to the ways in which ontological reflection (upon the situated constitution of meaning) fore-structures the delineation of the empirical interpretation’s objects of inquiry by disclosing the tendency to actualize possibilities within the interrelatedness of practices under study (Ginev 2013b, Ginev 2014). At issue in the fore-structuring is the question of how these objects exist in a horizon of possibilities that might be appropriated. It goes without saying, however, that double hermeneutics is something more than a relation of fore-structuring between empirical and non-empirical methods.¹¹

In the terms of hermeneutic phenomenology, one would say that ontic-interpretative description refers to a domain’s “factuality” of concerted practices and multiple entities, while ontological reflection (as launched and guided by radical reflexivity) deals with a domain’s “facticity.” (The distinction between “work-world” and “worldhood” as discussed earlier is in fact a special case of the distinction between factuality and facticity.) On this account, factuality consists in the totality of thematically given entities and “choreographies” (in the sense discussed previously). Factuality embraces, as it were, the whole of entities and

¹⁰ The Heideggerian way in which I am using the idea of double hermeneutics here differs essentially from the way in which Antony Giddens makes use of it.

¹¹ The methodology of double hermeneutics takes into account the dual status of interpretation that is at once a cognitive procedure and an “existential phenomenon.” Interpretation as an existential phenomenon is to be addressed by an ontology of “practices and possibilities.” Situated transcendence has a character of hermeneutic circularity. Stressing this character is the argument that there is a dimension of the interpretative that is irreducible to interpretation as a particular cognitive procedure. This is why in the tradition of hermeneutic phenomenology the interpretation which appropriates possibilities and “articulates the world” is treated as an “existential” (a principal characteristic of the meaning of being/existence).

practices composing a domain's actual reality. Furthermore, factuality refers to both a domain's normative orders and its networks of causal relations. A domain's empirical ontology should make sense of these orders and networks by procedurally describing the enactments of entities in practices. By contrast, facticity is the ongoing constitution of meaning through the appropriation of possibilities projected by the interrelatedness of practices. Given the situated transcendence of what gets constituted meaningfully, the appropriation and actualization of possibilities takes place within the same interrelatedness. Coming to grips with facticity requires hermeneutic-ontological reflection upon the interpretative interplay of practices and possibilities.¹²

To stress again, situated transcendence (of multiple entities and realities) is what in (purely) empirical ontology remains inaccessible. The relation of factuality to facticity brings to the fore the relativity of situated transcendence: factuality is always situated in facticity, whereas facticity constantly transcends a domain's actual reality. Yet both the way of situatedness (as actual state within a leeway of possible states) and the way of transcendence (as inexhaustible horizon of projected possibilities) are continuously changing as a result of continuous actualizations of possibilities that constitute meaning. By placing emphasis upon the hermeneutic fore-structuring of empirical ontology by reflecting upon a domain's potentiality for being, double hermeneutics makes the relativity of situated transcendence its principal theme. Thus considered, the hermeneutic fore-structuring relativizes ontological difference within the diverse scenarios of studying multiple entities and realities.

Integrating ontological difference into studies of empirical ontology changes the thematic focus of

investigation. More appropriate to the hermeneutically extended version of empirical ontology are not local realities like "hospital Z," but, for instance, a global recasting of an illness (say, from a metabolic to an endocrinological one) and the concomitant changes of the correspondent disease. A purely empirical (ethnographic) study maintains its character by describing clearly localizable (in space and time) practices. Yet if the interrelatedness in which entities get enacted and multiplied is dispersed to many (physically disconnected) places, and at each of these places the "choreographies" are distinguished by their own regimes of temporality (of production and reproduction of entities and states), then obviously the temporal-spatial unity of the interrelatedness is not immediately (empirically) given. Nonetheless, the human-nonhuman network (in which, to stick with the example, a global recasting of an illness/disease takes place) presupposes the constitution of a non-empirical temporal-spatial "fusion" of clinical, scientific, diagnostic, technological, administrative-bureaucratic, and other practices. It is again a fusion-creating-dynamic-unity that requires for its analysis non-empirical ontological reflection. A particular task of this reflection would consist in scrutinizing how the new network of practices—in which the illness/disease being recast becomes enacted—creates a new "chronotope." The latter is a unity of practices' temporality and spatiality that is never immediately given, but exists in the temporalizing and spatializing horizons of the enacted entity. The chronotope of interrelated practices is something that belongs to facticity and not to factuality. The ontic human-nonhuman multiplication of what becomes enacted in the network of practices takes place in a chronotope that is constantly in the making.

4. Conclusion

Following a tendency in STS tradition toward empirical ontology, I have tried to adumbrate a move from radical reflexivity to double hermeneutics that integrates ontological difference into empirical studies of multiple entities and realities. This move is in line, in my view, with the observation that the turn to ontology should not be seen as a way of grounding the empirical study of practices in a theory of what is ready-made (Woolgar and Lezaun 2013, 336). Doubtless there is "idiosyncratic critical sensibility" involved in the reluctance to take the world at face value. It is this

¹² The distinction between "factuality" and "facticity" is the most straightforward way of explicating the idea of the ontological difference. It allows one to come to grips with the difference between empirical ontology and (non-empirical) ontology of the constitution of meaning and the meaningful articulation of a domain of orchestrated practices. The latter is ontology of the potentiality for being (qua ongoing constitution) of such a domain. At issue in this ontology is the question of how the interrelatedness of practices projects possibilities that get appropriated and actualized within the same interrelatedness. There is here a hermeneutic circle (between projected horizon and the particular meanings contextually constituted), and for that reason one might insist that the "being of interpretation" (as "existential") reveals the "being of meaning constitution."

sensibility that has to be assisted by a radical reflexivity and a methodology of double hermeneutics. Thus, while the turn to ontology ought to continue to be an essentially empirical enterprise, critical sensitivity should be extended to cover the non-empirical dimensions of ontological interpretation.

As indicated earlier, studies of empirical ontology demonstrate a clear commitment to post-metaphysical initiatives and agendas. The further engagement of these studies with radical reflexivity, double hermeneutics, and ontological difference will enhance their dialogue with hermeneutic phenomenology and other traditions of interpretative theorizing in which this commitment is of prime importance.

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Invited paper

RATIONALITY AND CONSCIOUSNESS FROM A GENETIC PERSPECTIVE

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Abstract:

Rationality and consciousness are strictly correlated. If one evolves, the other necessarily changes accordingly. Of all the possible modes of inquiry, this paper adopts a process genetic perspective informed by the historical speculations of Julian Jaynes. First, we co-define consciousness and rationality. Second, we take up again Jaynes's insight: (proto-)consciousness has a history, or consciousness has a pre-history. Third, we underline that the sharpening of operational rationality has involved a palpable impoverishment of consciousness over the ages and nefarious consequences for our future.

Key words: Alfred North Whitehead, William James, Julian Jaynes, Virgil Gheorghiu, George Orwell, Consciousness Studies, Process Thought, Philosophy of Psychology, Philosophy of Religion, Shamanism, Hallucination.

1. Prologue on Cultural Relativism

Cultural relativism is a tricky requirement in philosophy, especially if one seeks to assess the nature of rationality itself. On the one hand, rationality obviously comes with variegated hues and textures in different cultures, and it has evolved dramatically as cultures themselves morphed, oftentimes developing surprising hybrids such as Judeo-Christianity; on the other hand, if there is something like the unity of the human species—the surrealistically named *homo sapiens*—then there must be a common denominator to all forms of rationalities. Three basic approaches are possible to probe this question.

Synchronically, one can try to contrast the various rationalities co-existing today. For instance, western logicians have long toyed with the principle of non-contradiction and the excluded middle to differentiate rationalities, sometimes with the expression of an interest for non-European thought such as Buddhism and Taoism. To exemplify: Graham Priest promotes a transconsistent logic where some contradictions are true (he labels them “dialetheias”); the quantic logic, framed by Garrett Birkhoff and John von Neumann to cope with the advances in microphysics, revokes, for its part, the excluded middle.¹

Diachronically, two main historical perspectives have been explored. On the one hand, the enduring contrast between Western and Buddhist logics, first pointed out by Schopenhauer, was examined by Stcherbatsky and lately by Matilal.² On the other hand, the mythological way of thinking has been endowed with some form of rationality, either because it announced science, or because it constitutes an incommensurable form of culture (see the struc-

¹ Graham Priest, *In Contradiction. A Study of the Transconsistent*, Dordrecht, Martinus Nijhoff Publishers, 1987; Garrett Birkhoff and John von Neumann, “The Logic of Quantum Mechanics,” *Annals of Mathematics*, 37, 1936, pp. 823-843.

² Arthur Schopenhauer, *Über die vierfache Wurzel des Satzes vom zureichenden Grunde*, Frankfurt am Main, 1813; F. Theo Stcherbatsky, *Teoriia poznaniia i logika po ucheniiu pozdnieshikh' buddistov*, St.-Petersburg, 1903-1909, later translated in German as *Erkenntnistheorie und Logik nach der Lehre der späteren Buddhisten*, München, O. Schloss, 1924; Bimal Krishna Matilal, *Perception: An essay on Classical Indian Theory of Knowledge*, Oxford, Oxford University Press, 1986.

turalist approach to myth and its anarchic contemporaries).³

Genetically, the horizon is broadened and the question becomes (or is correlated with) the emergence of consciousness itself. Speculative philosophy tends to plunge in at this deep end of the pool. Consciousness is a hot topic in philosophy and science, cognitive or otherwise; what does a process genetic perspective bring to the understanding of rationality? The basic conceptual framework that has been explored in *Process Approaches to Consciousness in Psychology, Neuroscience, and Philosophy of Mind* (2009) is the following:⁴

First, consciousness and the cognitive functions of the human mind are not static operators at all, they are the transient phylogenetical result of a long adaptive process. Under the pressure of environmental adjustment (better knowledge allows a better chance for survival), the human intellect has become a master in the logic of solid bodies and “Aristotelian” logic, but this is just an evolutionary adjustment to a limited—perceived—segment of a throbbing and coalescing world. In sum: the categories that are a priori for the individual are a posteriori for the species (Spencer, *Principles of Psychology*, 1855).

Second, these functions result furthermore from an ontogenetical process: individuals are not born fully equipped with the rational apparatus embodied in consciousness-zero of adults. Four temporally and logically sequenced stages can be distinguished: the sensorimotor stage (ages 0–2) during which sense perception and spatial movement are tuning-in to explore the world; the preoperational stage (ages 2–7) which coordinates motor skills with no significant mental actions on objects; the concrete operational stage (ages 7–11) which exhibits logical thinking only about concrete operations directed at objects and events; and the formal operational stage (ages 11–adult) which exhibits the ability to think and

reason abstractly on a representation of the world (Piaget, *La Représentation du monde chez l'enfant*, 1926). In a nutshell, Piaget claims that the child slowly emerges from a quasi-mythological mode of understanding to a mature, formally consistent one.

Third, the evolutionary success of humans also lies in the fortunate oversimplifications the species has achieved and perpetuates through cultural endeavours. This is what James calls the question of co-consciousness.⁵ Consciousness, in other words, necessarily takes place in a pluralistic world. Evolution in the biosphere and education in the ethosphere are intertwined in free individuals. Koinogenesis⁶ is the process of convergence of individual consciousnesses through learning. It is a process of integrative synchronic tuning that can be contrasted with schismogenesis—or progressive (pathological) differentiation (Bateson, Naven 1936).⁷

Phylogenesis, ontogenesis, and koinogenesis are, of course, three facets of the same prism. Phylogenesis names the natural co-evolution of human beings and their environment; onto- and koinogenesis refer to the two dimensions of their cultural evolution: individuation and socialization. This three-fold grid allows an understanding of both the unity of the sapiens genus and the significant differences that exist between the mental apparatus of a XVth century Tuscan aristocrat, an Australian Aborigines, and a Welsh mechanical engineer.

2. Jaynes's Genetic Perspective

In this paper, I will inquire into the genesis of the so-called modern consciousness from a cultural perspective inspired by, but not limited to, Jaynes's *Origin of Consciousness in the Breakdown of the*

³ Claude Lévi-Strauss, *Les Structures élémentaires de la parenté*, PUF, 1949; Werner Wilhelm Jaeger, *The Theology of the Early Greek Philosophers. The Gifford Lectures 1936*, Oxford, Oxford University Press, 1947; Francis MacDonald Cornford, *Principium Sapientiae. The Origins of Greek Philosophical Thought*. Edited by W. K. Guthrie [posthumous], Cambridge, Massachusetts, Cambridge University Press, 1952; Paul K. Feyerabend, *Against Method: Outline of an Anarchistic Theory of Knowledge*, London, New Left Books, 1975.

⁴ Michel Weber and Anderson Weekes (eds.), *Process Approaches to Consciousness in Psychology, Neuroscience, and Philosophy of Mind* (Whitehead Psychology Nexus Studies II), Albany, New York, State University of New York Press, 2009.

⁵ William James, Letter to Bergson, 1903, in *The Letters of William James*. Edited by his son Henry James, Boston, The Atlantic Monthly Press, 1920, v. II, pp. 184–185.

⁶ From koinos, meaning “common,” “public.” I picked the concept in order to contrast Bateson's schismogenesis and later realized Cornélius Castoriadis made basically the same claim in *L'Institution imaginaire de la société* (Paris, Éditions du Seuil, 1975: *The Imaginary Institution of Society*, Translated by Kathleen Blamey, Cambridge, Massachusetts, MIT Press).

⁷ See also e.g., “Culture Contact and Schismogenesis,” *Man* XXXV, 1935, pp. 178–183, reprinted in Gregory Bateson, *Steps to an Ecology of Mind. Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology*. Pref. by Mark Engel, London, Intertext Books, 1972, pp. 61–72.

Bicameral Mind (1976).⁸ As a result, phylogenesis is here considered as a given fact: the central nervous system constitutes the basic hardware (so to speak) of the homo sapiens. What is at stake is the evolution and hybridization of cultures that have brought changes to the onto-koinogenesis dialectics (the “software”).

When Jayne’s work is mentioned, a distinction is generally made between his theory of consciousness and his history of consciousness, with the later sometimes considered as an meek eccentricity. On the contrary, it seems to me that Jaynes’s main contribution lies in his discussion of the emergence of “modern” consciousness, and that his questionable theory of consciousness needs to be assessed from that perspective. Jaynes’s theory draws heavily on the analysis of the language of the Iliad by Snell (1948);⁹ it rests upon four main hypotheses, each of which could potentially stand or fall on their own, as he himself claims in his Afterword: a language-based consciousness (with Descartes against Russell),¹⁰ the bicameral mind (a mental model interpreting auditory hallucinations), dating the emergence of consciousness, and the double brain qua neurological model for the bicameral mind.

More precisely, what really matters for our analysis are the facts that Jaynes underlines: the

bicameral theory is introduced in order to understand the shift (or breakdown) from the bicameral to the monocameral mind. According to evidence from Mesopotamia, the breakdown began about 1200 B.C.E. and was due to chaotic social disorganization, overpopulation, and “probably to the success of writing in replacing the auditory mode of command.”¹¹ Before “modern consciousness,” there was a different mentality based on verbal hallucinations.

In other words, the present argument does not rely upon the bicameral theory but upon the bicameral facts. For instance, unlike Jaynes, I argue that, by definition, one cannot refuse consciousness to the homo sapiens. The discussion of the breakdown of the bicameral mind is, however, key to understanding that variations in culture can substitute for environmental differences and induce a significant shift in the very nature of consciousness.

3. Co-Defining Consciousness and Rationality

The first move is to define consciousness. From a radical empiricist standpoint, we have to acknowledge that many different types and grades of consciousness are given in everyday experience. However, no argument is possible unless one specifies its topic.¹² Hence two speculative proposals: on the one hand, a sharp definition has to be given; on the other hand, it should be plain that such a definition will only provide a standard state (the concept of state being itself problematic in process philosophy).

Let consciousness-zero be defined by (i.e., solely instantiated in) public debate or conversation. It thus demands at least two interlocutors, present in person and sharing the same rationality, which boils down to a certain public language structured by the principles of identity, of non-contradiction, and the

⁸ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, Boston / New York, Houghton Mifflin Company, 1976; edition quoted: Boston/New York, Houghton Mifflin, A Mariner Book, 2000.

⁹ Ivan Leudar and Philip Thomas, *Voices of Reason, Voices of Insanity. Studies of Verbal Hallucinations*, London, Routledge, 2000, p. 29, citing Bruno Snell, *The Discovery of the Mind. The Greek Origins of European Thought*. [1948] Translated by Thomas G. Rosenmeyer, Oxford, 1953. Cf. Oliver Sacks, *Hallucinations*, New York, Knopf/Picador, 2012.

¹⁰ Some reservation are nevertheless expressed: “A further major confusion about consciousness is the belief that it is specifically and uniquely the place where concepts are formed. [...] Max Müller, in one of his fascinating discussions in the last century, brought the problem to a point by asking, whoever saw a tree? ‘No one ever saw a tree, but only this or that fir tree, or oak tree, or apple tree [...] Tree, therefore, is a concept, and as such can never be seen or perceived by the senses.’ [...] Now the relation between concepts and consciousness could have an extensive discussion. But let it suffice here simply to show that there is no necessary connection between them.” (Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 30, quoting Max Müller, *The Science of Thought*, London: Longmans Green, 1887.)

¹¹ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 453.

¹² Unlike Dennett: “Now, another thing that philosophers usually do on these occasions is demand definitions of consciousness, of mind, and of all the other terms. I am not going to do that either, because I don’t think that would be constructive at this point. If I thought I could bring his entire project crashing down with one deft demand for an impossible definition, I would do it, but I don’t think so.” (Daniel Dennett, “Julian Jaynes’s Software Archeology,” in *Brainchildren: Essays on Designing Minds*, Cambridge, Mass.: MIT Press, A Bradford Book, 1998, pp. 121-130)

excluded middle.¹³ In other words, consciousness-zero is unsurprisingly characterized by two main dimensions: rational and physical.¹⁴ Any individual who enjoys a rational discussion with a fellow human being present in person is conscious. If these two criteria are not met, we cannot speak of consciousness—but we also obviously cannot say that we are unconscious when we debate on the phone, when we dance the tango, or when we attend a conference. We need to envision a continuum of states of consciousness radiating from the zero-state. In the lexicon of the Nuclear Pivotal Model of Normal Consciousness, the sapiens is endowed with a form of consciousness made up of self-awareness and global awareness.¹⁵

Similarly, rationality-zero requires a definition. In the present context, the most operational one involves the three Aristotelian principles already evoked. They approximate adequately the onto-psychology of substance that defines consciousness-zero and thus common sense.

The ontology of substance is usually introduced with the help of the concept of *ousia* and exemplified with Aristotelian hylemorphism. In the context of the present argument, it will be better to start from the presuppositions of this concept. They can be found in the three “principles” or “laws” that were first articulated by Aristotle and later championed by Boole. The hylemorphic concept of substance indeed provides the basis for the enduring identity of individuals (matter) and the morphic changes (form)

they can endure, provided that they are not contradictory.

The principle of identity states that we come to know all things insofar as they have some unity and identity.¹⁶ This must be linked with the substance-attribute ontology granting permanence amid flux. Experience certainly discloses becoming, flux, variability, and change—but some patterns can be identified and some individuals seem totally stable (if not in direct sense-perception, at the very least through intellectual cognition). Without individuals, the use of any language whatsoever seems irremediably compromised, and scientific expertise collapses as well.

The principle of contradiction is to some extent the negative side of the principle of identity: it claims that the same attribute cannot, at the same time and in the same respect, belong and not belong to the same subject.¹⁷ It directly springs from Parmenides’ rejection of Heraclitus’ claims. In hylemorphic terms: a given matter (or subject) will accept specific forms (or predicates) insofar as they do not contradict each other.

According to the principle of excluded middle (or “*tertium non datur*”), there cannot be an intermediate between contradictories: of one subject we must either affirm or deny any one predicate.¹⁸ There is no third possibility: either it rains or it does not. There is no such a thing as a light drizzle.

How are these ontological requirements reflected in psychology? The physical requirement for consciousness-zero—at least two people socializing in dialogue—is rather straightforward, but the rational one is a bit more nebulous. What does it mean for a conversation or a judgement to be rational? The three Aristotelian principles do not only provide the basic functions that the concept of substance is supposed to carry out, they also mark out the territory of rationality itself: to be rational, a proposition needs to respect these principles; if it does not, it is irrational. A contradiction is not irrational, since it possesses a clear status in the system: it is a statement that is always false, and everybody agrees that it is so because some mistake must have occurred in the chain of reasoning. A paradox, however, is irrational: as its etymology shows, it is a contradiction that has the appearance of truth, with the result that there

¹³ The principle of identity requires that there is only one such “thing” as “consciousness;” the principle of contradiction claims that one cannot, at the same time and in the same respect, be conscious and not-conscious; the principle of excluded middle adds that there is no third possibility: one has to be either conscious or unconscious. (The correlation between consciousness-zero and rationality-zero with these three principles operates at a deeper level than Piaget’s analysis of the gradual shift from concrete operations to formal operations (i.e., the hypothetico-deductive reasoning) with a set of types of rational operations: arithmetical, logical, relational, geometrical, temporal, mechanical...)

¹⁴ Michel Weber, *Whitehead’s Pancreativism*. Jamesian Applications, Frankfurt / Paris, Ontos Verlag, 2011.

¹⁵ The Nuclear Pivotal Model of Normal Consciousness is sketched in my “Consciousness and Rationality” in Michel Weber and Anderson Weekes (eds.), *Process Approaches to Consciousness in Psychology, Neuroscience, and Philosophy of Mind* (Whitehead Psychology Nexus Studies II), Albany, New York, State University of New York Press, 2009, pp. 345-384. See Figure 1 in the Appendix.

¹⁶ *Metaphysics Beta*, 4.

¹⁷ *Metaphysics Gamma*, 3; *Posterior Analytics I*, 77a10-22.

¹⁸ *Metaphysics Gamma*, 7; *Posterior Analytics I*, 77a22-25.

are numerous opinions regarding the way of understanding them; no consensus prevails. The non-rational is for Aristotle matter, the complementary of form in his hylemorphism.¹⁹

A short parenthesis is important in order to avoid a misunderstanding. On the one hand, the three principles identified by Aristotle after Plato's repeated allusions constitute the logical expression of an ontological presupposition: the substantialism of the "ousia." On the other hand, the "laws of thought" later systematized by George Boole (1815–1864)²⁰ are inference rules. Four main stages account for the shift from the onto-logical principles (and especially the "principium contradictionis") to the rational laws (and the late "lex contradictionis"²¹). First, Aristotle (384–322) formulates the three principles, but doesn't always distinguish or articulate them clearly. Second, the voluntarist theology of Ockham (1285–1347) makes the principle of non-contradiction into a law governing God's will as he creates the finite world. Third, Christian Wolff (1679–1754) is probably the first, in his *Philosophia rationalis sive Logica* (1728), to group the three principles, but he still doesn't speak of a *lex cogitationis*. Fourth, the principles become laws of thought in William Hamilton's (1788–1856) *Lectures on Metaphysics and Logic* [1836–1837], posthumously published in 1859. Boole and the post-Kantians followed.²²

The impact of substantialism on the conception of consciousness is threefold: entitativity, exclusiveness, and disjunction. The principle of identity requires that there is only one such thing as "consciousness," or that there are sharp "faculties." Consciousness is a well-defined (unique and identical) entity (theatre- or receptacle-like). I am conscious in the exact same way as you are—when you are conscious. Descartes' concept of a *res cogitans* gives a fair idea of the total transparency that is endowed to

the subject who is able to bracket all form of business with the *res extensa*. The principle of contradiction claims that one cannot, at the same time and in the same respect, be conscious and non-conscious. Consciousness-zero is thus obtained like one switches the television on, and discarded just like one switches it off. The principle of excluded middle adds that there is no third possibility: one has to be either fully conscious or fully unconscious. There is no half-way house between full consciousness and full unconsciousness. As a result, there is no possible Archimedean point to grasp the nature of consciousness. Consciousness is like a box that is either fully transparent or fully opaque. There is no stepping outside it to, so to speak, objectify it.

Likewise, when Jaynes proposes an emergent theory of consciousness that is grounded on a binary understanding of its stakes (it is all or nothing),²³ he leaves no room for a continuum of states of consciousness, and even less so for altered states or a remote form of animal consciousness. When he argues that consciousness springs from a metaphor rooted in the visual awareness of spatial relations and that it is a very recent phenomena (3000 years old), Jaynes furthermore totally ignores Bergson (and the entire tradition springing from Augustine, if not Plotinus),²⁴ who claims the exact opposite: lived time is actually the very root of consciousness. Remember that, obviously influenced by Bergson and Whitehead, Jonas has shown very straightforwardly the inevitable bias of all concepts inspired by the metaphor of vision, mainly because of the neutralisation of time and causation. To say it in another way: such an ophthalmic metaphor imposes the idea of the spectator-subject, i.e., of a totally passive on-

¹⁹ See A Pluralistic Universe's concept of "non-rational."

²⁰ George Boole, *An Investigation of the Laws of Thought on Which are Founded The Mathematical Theories of Logic and Probabilities* [1854], New York, Dover Publications, Inc., 1958; cf. Chapter XV, "On the Aristotelian Logic," pp. 174 sq.

²¹ I bracket here Leibniz' conceptual renovation in terms of the principle of sufficient reason and identity of indiscernibles, as well as Schopenhauer's own synthesis in his *Über die vierfache Wurzel des Satzes vom zureichenden Grunde* (1813).

²² Notably Fichte and Hegel; cf. Christoph von Sigwart's (1830–1904) *Logik* (1873–1878). Anderson Weekes is working on this topic for a forthcoming *Chromatikon* issue.

²³ "Its main idea is a metaphor: Just as the property of wetness cannot be derived from the properties of hydrogen and oxygen alone, so consciousness emerged at some point in evolution in a way underivable from its constituent parts. While this simple idea goes back to John Stuart Mill and G. H. Lewes, it was Lloyd Morgan's version in his *Emergent Evolution* of 1923 that really captured the cheering." (Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 12; cf. Marcel Kuijsten (Edited by), *Reflections on the Dawn of Consciousness: Julian Jaynes's Bicameral Mind Theory Revisited*, Henderson, NV, Julian Jaynes Society, 2006. See <http://www.julianjaynes.org/>).

²⁴ "Time is an obvious example. [...] This spatialization is characteristic of all conscious thought." (Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 60.

looker factually unaffected by the scenery.²⁵ It is precisely that ideal of a pure objective knowledge that has opened the doors to a technoscience that manipulates things and renounces living with/in them.

4. Modes of Transilience

Now that we are fully equipped to understand the stakes, let us again take up Jaynes's insight: (proto-)consciousness has a history, or consciousness has a pre-history. The striking thesis that weaves his inquiry constitutes a Darwinian preface of sorts to the *Phänomenologie des Geistes* (1807).

Transilience evokes the leaping from one state of consciousness to another.²⁶ Whitehead has framed a strong argument, partially borrowed from James, for the epochal theory of change. However, our point is not to elucidate these leaps (that are ontologically arational), but to articulate them in a meaningful way. Hence the following five stages punctuating the metamorphosis of nature into post-modern culture: bios, mythos, logos, technos, and thanatos.

4.1. Bios—Paleolithic and Shamanic

According to recent genomic studies, homo sapiens is 706,000 years old.²⁷ Since radiocarbon dating is able to determine the age of carbonaceous materials up to about 60,000 years old, it constitutes a reliable tool only to cover the Upper Paleolithic (50,000–10,000 y.a.). Paleolithic art (40,000–10,000 y.a.) offers the early—or the late, depending on the depth of your vision—witness of the hominization process.

The most adequate interpretation of parietal art involves a shamanistic worldview that perfectly exemplifies James's triune pattern more/flux/union.²⁸ First, the basic ontological struc-

ture is three-tiered and features animal and spiritual beings that channel their influences through gateways. The worlds are not simply superposed; there is a permeability, a receptiveness of the worlds to each other's influence.²⁹ Second, the idea of flux is archetypal in shamanism. Primo, the shamanistic ritual per se involves the so-called "shamanistic flight" or exstasis. Secundo, the worlds are susceptible to morphing into one another: becoming-animal, becoming-divine and becoming-human are possible in a world where flux and interconnection are the rule. Everything is animated, everything is endowed with power, everything is pointing at some meaning.³⁰ Tertio, communication with spirits amounts to pragmatic transactions that remind us of barter and of bargain. Third, the harmonization, the bringing together of the worlds, is what matters. One seeks peace within oneself, with his or her fellow humans, with all forms of terrestrial life, and eventually with the other worlds. Shamanism is above all a matter of curing—and the shaman has first to cure herself from the "shamanic illness" that usually structures her initiation.³¹ It is also a matter of enhancing the social coherence when need be.

Humans live in a cosmos that is fully alive: it is continuously growing, with each of its forms of life susceptible to morphing into one another. Meaning is anchored in the feminine archetype. There is no dualism between mind and body, our world and the spirit worlds, animals and humans. The most important senses are taste, smell, and touch; they are the senses of proximity. No elaborate language is expected in such a context; in the lexicon of the Nuclear Pivotal Model of Normal Consciousness, the sapiens is endowed with a form of consciousness made of self-awareness and global awareness. Rationality rests upon a very plastic principle of identity.

²⁵ Hans Jonas, *The Phenomenon of Life : Toward a Philosophical Biology*, Chicago and London, The University of Chicago Press, 1966.

²⁶ OED's definition: "a leaping from one thing to another, or abrupt transition"

²⁷ The nomenclature has changed in 2003, and we do not belong anymore to the "homo sapiens sapiens." The oldest fossil remains of anatomically modern humans date to 195,000; genomic data suggests that the split of the sapiens and the Neanderthal took place 370,000 y.a., and that the coalescence time of the human and Neanderthal reference sequences is 706,000 y.a. (Michael R. Cummings, *Human Heredity. Principles and Issues*, Boston, Brooks/Cole, Cengage Learning, 2010, p. 428).

²⁸ See my "On Religiousness and Religion. Huxley's Reading of Whitehead's Religion in the Making in the

Light of James' Varieties of Religious Experience," (in Jerome Meckier and Bernfried Nugel (eds.), *Aldous Huxley Annual. A Journal of Twentieth-Century Thought and Beyond*, Volume 5, Münster, LIT Verlag, March 2005, pp. 117–132) and "Shamanism and proto-consciousness," in René Lebrun, Julien De Vos et É. Van Quickenberghe (éds), *Deus Unicus*, Turnhout, Brepols, coll. *Homo Religiosus* série II, 14, 2015, pp. 247–260.

²⁹ Jean Clottes, *Pourquoi l'art préhistorique?*, Paris, Éditions Gallimard, 2011, pp. 156 and 266.

³⁰ Jean Clottes, *Pourquoi l'art préhistorique ?*, pp. 128, 151–152.

³¹ According to Eliade, there are four ways of becoming a shaman: through the "call," by inheritance, by personal ambition, or by the will of the tribe.

4.2. Mythos—Neolithic and Bicameral

Around 8,000 y.a., thanks to an abrupt climate change (the Holocene Climate Optimum), a bundle of cultural modulations were introduced: sedentarization, agriculture, domestication of animals and plants, slavery, patriarchy, and transcendental theology (Jehovah looses his Asherah³²). Hence meaning is provided by a male figurehead and all the archetypes of malehood crystallize. They have been sketched repeatedly in the key context of process theology: God as Cosmic Moralizer, God as the Unchanging and Passionless Absolute, God as Controlling Power, God as Sanctioner of the Status Quo—while “God seems to be the archetype of the dominant, inflexible, unemotional, completely independent (read “strong”) male.”³³ Biotic life is mythologized: the Golden Age, the Age of Heroes, is gone, and humans have to toil and suffer. They now interpret their lives according to the standards belonging to another time: the “*illo tempore*” still rules, but only through a sophisticated narrative soon to be written down.

Jaynes asks “what is the psychology of the Iliadic hero?” It seems heroes did not have any ego whatever: the god “simply leads, advises, and orders.” These gods are what we now call hallucinations: “In distinction to our own subjective conscious minds, we can call the mentality of the Myceneans a bicameral mind. Volition, planning, initiative is organized with no consciousness whatever.”³⁴ Jaynes speaks of a bicameral mind because at that time “human nature was split in two, an executive part called a god, and a follower part called a man.”³⁵ However, his main argument is not theological, but neuro-psychological (it involves the “vestigial functioning of the right Wernicke’s area in a way similar to the voices of gods”³⁶) and sociological: “The bicameral mind is a form of social control and it is that form of social control which allowed

mankind to move from small hunter-gatherer groups to large agricultural communities. The bicameral mind with its controlling gods was evolved as a final stage of the evolution of language. And in this development lies the origin of civilization.”³⁷ This basically means that, before the second millennium B.C.E., everyone was operationally schizophrenic, effectively unconscious, ruled over by hallucinatory inner voices.³⁸ In sum, the hallucinated voices that are called god(s) were a tool of social control. This thesis has two main premises: one, the correlation of hallucination, religion, and social control; two, when the hallucinations disappear, a religious reform is implemented and is accompanied by a new form of social control.

This is a very bold thesis. What do we learn from nosological studies? By 1855, the arguments about hallucinations were already threefold: “The first problem concerned the nature of hallucinatory experiences: are they inner perceptions, conceptions experienced as perceptions, or vivid sensory memories? The second problem concerned whether hallucinations necessarily involve mistaking internally generated experiences for perceptions. Either the visions of artists are not hallucinations or the reality confusion is not a necessary aspect of the meaning of ‘hallucination’. This is important, since [...] reality confusion nowadays distinguishes true hallucinations from pseudohallucinations. The third problem was, do hallucinations and madness go hand in hand?”³⁹ The current definition has not changed much since it was articulated by French mid-nineteenth-century psychiatry: hallucinations are individual, perception-like experiences obtained in the absence of appropriate external objects; in a nutshell, they are errors of perception, “a sensory perception without external stimulation of the relevant

³² Voir, e.g., Israël Finkelstein et Neil Asher Silberman, *The Bible Unearthed*, New York, The Free Press, 2001; Robert N. Bellah, *Religion in Human Evolution From the Paleolithic to the Axial Age*, Cambridge, Massachusetts, Harvard University Press, 2011, p. 289.

³³ John B. Cobb, Jr. and Griffin, David Ray, *Process Theology. An Introductory Exposition*, Philadelphia, Pennsylvania, The Westminster Press, 1976, pp. 8 sq.

³⁴ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, pp. 73–75.

³⁵ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 84.

³⁶ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 106.

³⁷ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 126. “In the bicameral era, the bicameral mind was the social control, not fear or repression or even law. There were no private ambitions, no private grudges, no private frustrations, no private anything, since bicameral men had no internal ‘space’ in which to be private, and no analog to be private with. All initiative was in the voices of gods.” 205

³⁸ “No ‘god’ speaks through human lips in the truly bicameral age.” (Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 340) “Before the second millennium B.C., everyone was schizophrenic.” (p. 405)

³⁹ Ivan Leudar and Philip Thomas, *Voices of Reason, Voices of Insanity. Studies of Verbal Hallucinations*, p. 10.

sensory organ.”⁴⁰ They are usually not confused with the voices heard by everybody. However, nosology itself relativizes the category: perceptual hallucinations cannot be systematically interpreted as a symptom of insanity; for Socrates, Achilles, and Schreber, they were voices of supernatural agencies.

During the age of mythos, humans still lived in a fully alive cosmos, but meaning tended to be anchored in the male archetype. There is no real dualism between mind and body, our world and the spirit worlds, animals and humans. The most important sense is hearing, which is a sense of quasi-proximity. Language spreads its wings to tell the story of the gods, the heroes, and their demiurgical adventures; in the lexicon of the Nuclear Pivotal Model of Normal Consciousness, the sapiens is endowed with a form of consciousness formed mainly from self-consciousness and social consciousness. Here also rationality rests upon a very plastic principle of identity and a loose usage of non-contradiction.

4.3. Logos—(proto-)Democratic

With the development of writing around the fourth millennium B.C.E., a new stage was reached in the differentiation of humans from their natural environment.⁴¹ Carothers claimed in 1953 that schizophrenia may be a necessary consequence of

literacy.⁴² Interestingly, McLuhan added that Carothers’s great contribution has been “to point to the breaking apart of the magical world of the ear and the neutral world of the eye, and to the emergence of the detribalized individual from this split.”⁴³ (Curiously, Jaynes cites neither Carothers nor McLuhan.)

Foraging tribes that became communities have grown into societies where written laws were introduced to structure the common life. The apex of the age of logos is democracy. The ideal of direct democracy was created during the Age of Pericles (also known as the Golden Age of Athens), circa 462–429 B.C.E.⁴⁴ Citizens were required to argue in order to reach an agreement on the policies fostering the common good. Power was shared by the citizenry, allowing both individuation and solidarity. Unfortunately, Greek direct democracy incoherently relied upon a slave-system of labour.

For his part, Jaynes suggests the following chronology: the oldest evidence of the departure of the gods is found about 1,230 B.C.E., when an Assyrian carving depicted a living king kneeling before an empty throne.⁴⁵ For the first time the question

⁴⁰ “A sensory perception that has the compelling sense of reality of a true perception but that occurs without external stimulation of the relevant sensory organ. Hallucinations should be distinguished from illusions, in which an actual external stimulus is misperceived or misinterpreted. The person may or may not have insight into the fact that he or she is having a hallucination. One person with auditory hallucinations may recognize that he or she is having a false sensory experience, whereas another may be convinced that the source of the sensory experience has an independent physical reality. The term hallucination is not ordinarily applied to the false perceptions that occur during dreaming, while falling asleep (hypnagogic), or when awakening (hypnopompic). Transient hallucinatory experiences may occur in people without a mental disorder.” (American Psychiatric Association [APA], *Diagnostic and Statistical Manual of Mental Disorders*. Fourth Ed. [DSM-IV-TR], Washington, DC, APA, 1994, p. 767)

⁴¹ “Around 3000 B.C. comes a curious and very remarkable practice. It is a transmutation of speech into little marks on stone or clay or papyrus (or pages) so that speech can be seen rather than just heard, and seen by anybody, not just those within earshot at the time.” (Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 38)

⁴² John Colin Carothers, “Culture, Psychiatry and the Written Word,” *Psychiatry*, Vol. 22, N°4, November 1st, 1959, pp. 307–320; cf. his *The African Mind in Health and Disease*, Geneva, World Health Organization, 1953.

⁴³ Herbert Marshall McLuhan, *The Gutenberg Galaxy. The Making of Typographic Man*, London, Routledge and Kegan Paul, 1962, p. 22. He resumes his discussion of Carothers in *Understanding Media: The Extensions of Man*, London and New York, McGraw-Hill, 1964, p. 16.

⁴⁴ Democracy per se starts in Athens in 507 B.C.E. with Cleisthenes’s reformation and ends in 338 B.C.E. with Athens surrendering to Macedonia. Between the birth of Pericles (495–429) and Aristotle’s death (384–322) we have the acme of Greek civilisation. Socrates (470–399) lived precisely at that time, between the end of the Greco-Persian Wars (498–479) and the end of the Peloponnesian War (431–404).

⁴⁵ “About 1230 B.C., Tukulti-Ninurta I, tyrant of Assyria, had a stone altar made that is dramatically different from anything that preceded it in the history of the world. In the carving on its face, Tukulti is shown twice, first as he approaches the throne of his god, and then as he kneels before it. The very double image fairly shouts aloud about this beggarly posture unheard of in a king before in history. [...] Hammurabi, as we have seen in II.2, is always carved standing and listening intently to a very present god. And countless cylinder seals from his period show other personages listening eye to eye or being presented to the just-as-real figures of human-shaped gods.” (Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 223)

“Why have the gods left us?” resonates in religion.⁴⁶ The age of mythos (the bicameral age) was the time of the primacy of hearing and of the close presence of the gods; the age of logos (after the breakdown of the bicameral mind) is structured around the primacy of vision in a political space that has unfolded thanks to the absence—or at least the silence—of the gods. No matter the reasons Jaynes give for this shift (they are not all equally convincing),⁴⁷ the consequences are numerous: “This celestialization of the once-earthly gods is confirmed by an important change in the building of ziggurats: huge pedestals for the return of the gods from heaven and not houses for earthly gods as before.”⁴⁸

To a certain extent, the evolution of the archaic mind is reflected in the three parts of Plato’s soul: the biotic age is the kingdom of eros; the mythological age sees the rule of thymos; the logical age is sealed by the primacy of noos (spelled “nous” in later Greek). The concept comes from the word “no-ein,” to see, and it clearly refers to the conscious mind as we understand it today.

Humans live in a cosmos that is perhaps as yet alive, but its life operates according to the logos. Meaning is provided by laws allegedly reflecting justice. Mind and body, which had been conceptualized for a while as two distinct entities (ontic dualism) are, since Heraclitus and Pythagoras, made of a different stuff (ontological dualism).⁴⁹ The most

important sense is now vision, the neutral and objectifying sense par excellence. Language has become exceptionally elaborate; in the lexicon of the Nuclear Pivotal Model of Normal Consciousness, the sapiens is now conscious. By this time rationality rests firmly upon the onto-psychology of substance.

4.4. Technos—Industrialism and Materialism

“But lo! men have become the tools of their tools. [...]

We do not ride on the railroad; it rides upon us.”⁵⁰

Jaynes’s chronology stops with the breakdown of the bicameral mind and the shift from hearing to vision. The anthropological and theological consequences he depicts are impressive, but a sharper analysis of (e.g.) the following correlation would have been welcome: when the gods were part and parcel of our lives, we allegedly had no ego and no free will; when they departed, they were replaced by angels and demons, together with the one master god of transcendental monotheism, which is adumbrated in philosophy with Plato’s demiurge and Aristotle’s prime mover. Hence the emergence of three essential items of Western culture: the existence of the ego or soul, the question of free will, and the problem of evil.

“Technos” is a neologism that is used for its euphonic properties in the context of the introduction of the five stages. “Technè,” the proper Greek concept, is of no avail here, since we are not dealing

⁴⁶ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 226.

⁴⁷ “I have sketched out several factors at work in the great transilience from the bicameral mind to consciousness: (1) the weakening of the auditory by the advent of writing; (2) the inherent fragility of hallucinatory control; (3) the unworkableness of gods in the chaos of historical upheaval; (4) the positing of internal cause in the observation of difference in others; (5) the acquisition of narratization from epics; (6) the survival value of deceit; and (7) a modicum of natural selection.” (Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, 221)

⁴⁸ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, pp. 234–235

⁴⁹ “The first writer to feature the new concept of the soul is Heraclitus (540–c. 480 B.C.E.). He calls the soul of living man psyche; in his view man consists of body and soul, and the soul is endowed with qualities which differ radically from those of the body and the physical organs. We can safely say that these new qualities are irreconcilable with the categories of Homer’s ought; he does not even dispose of the linguistic prerequisites to describe what Heraclitus predicates of the soul. The new expressions were fashioned in the period which separates Heraclitus from Homer, that is to say the era of the lyric.

Heraclitus says (fr. 45): ‘You could not find the ends of the soul though you travelled every way, so deep is its logos.’ This notion of the depth or profundity of the soul is not unfamiliar to us; but it involves a dimension which is foreign to a physical organ or its function. To say: someone has a deep hand, or a deep ear, is nonsensical, and when we talk of a deep voice, we mean something entirely different; the adjective there refers to vocal expression, not to the function of the voice. In Heraclitus the image of depth is designed to throw light on the outstanding trait of the soul and its realm: that it has its own dimension, that it is not extended in space. To describe this non-spatial substance we are of course obliged to fall back on a metaphor taken from space relations. But in the last analysis Heraclitus means to assert that the soul, as contrasted with things physical, reaches into infinity. Not Heraclitus but the lyric poets who preceded him were the first to voice this new idea, that intellectual and spiritual matters have ‘depth’. [...]” (Snell, op. cit., p. 16; cf. p. 68)

⁵⁰ Henry David Thoreau, *Walden* [1854], Edited by Jeffrey S. Cramer, New Haven and London, Yale University Press, 2004, pp. 36 & 90

with technique per se, but with technoscience. In the same way that we have seen dramatic changes in the modalities of consciousness-zero from Paleolithic “bios” to Mesopotamian mythos and especially Greek “logos,” we now need to probe an issue that is too often swept under the carpet: how has the industrial revolution affected consciousness-zero?

The answer lies in the synergy between machines (and later machine-tools) and industrial capitalism (and later financial capitalism). On the one hand, machines changed the lives of humans: whereas tools are designed to match the anatomy of humans, machines require that humans adapt themselves to them, to their procedures, speeds, and contingencies. The most important technological innovation that allowed the transformation of an agrarian society into an industrial one is without a doubt the discovery of the steam engine, and more particularly the optimization of the steam locomotive by James Watt (1736–1819) in 1784. (Watt also invented the centrifugal governor in 1788.) The shift to oil production and to the combustion-engine is just a refinement of this process that later involved other forms of electricity production as well.

On the other hand, capitalism necessarily involves total exploitation in order to maximize private profit.⁵¹ What does this mean in practice? On the one hand, private profit is the key to all economical processes; on the other, it is generated by exploitation and alienation of all activities and resources. First, everything and everyone are but commodities, i.e., available resources. They have no intrinsic value in their natural environment. All individuals are thus means—especially “proles,” of course. Utility is the key-word. Second, this 360° commoditization activity takes place everywhere, in public as well as private spheres. Total exploitation starts in the homeland but should be geographically expanded as much as possible: globalization is a matter of principle.⁵² Third, this nefarious process is

synchronic as well as diachronic. All contemporarily available resources qualify for total exploitation, but past and future resources should not be sheltered from insatiable greed. For instance, oil and minerals that took millions of years to settle can be exhausted within a few generations without any second thought. Similarly, there is no need to try to preserve resources that would be essential for future generations. Whereas pre-industrial revolution commonsense used to require that all decisions take into account at least two future generations, simply because it was a graspable reality (an adult could get to know her children’s children) and an existential imperative (there was an inter-generational support), nowadays the life of one’s children and grandchildren do not seem to be of any interest to most denizens! Perhaps here we get a clear glimpse of what deculturation—if not plain evil—is. When nobody cares about children anymore, the end is near.⁵³

In sum: capitalism embodies a peculiar Human-Machine System: technoscience is piloted by capitalists for the sole benefits of capitalists. The consequent alienation is not simply doubled; there is a nefarious synergy at work. One cannot rule out the possibility of substituting another pilot (remember Huxley’s Island), and thus obtaining a technoscience working for the common good, but thus far this has never been allowed. For instance, communist countries did hope to create heaven on earth with the help of technoscience, but the experiment was promptly hijacked by the various forms of war launched upon them by capitalists. By 1989 their economy had bled to death, and the experiment was cancelled.

Humans survive now in a mechanical world that frames most aspects of their lives. Meaning is gone unless one cherishes material wealth. In other words, ontological dualism has degenerated into a full materialism. Rationality rests upon the hidden premises of technoscience. Whitehead remarked in 1933 that “the mere doctrines of freedom, individualism, and competition, had produced a resurgence of something very like industrial slavery at the base of society.” (AI 33–34) In his “Study of the Past” (also published in 1933), he insists that ugliness was the bru-

⁵¹ Alternative models, such as Scitovsky’s, Baumol’s, or Marris’s, can be ignored here.

⁵² Trotskyism is just the specular image of capitalism, but its logic is difficult to bypass (remember also Chomsky’s “mafia principle”). James Connolly, for example, repeatedly underlined that the Irish will not get rid of the British yoke unless they establish a socialist Republic: if not, the military occupation will be simply replaced by a capitalistic one. This, he argued, is what happened with the USA: “Not a Republic as in the United States, where the power of the purse has established a new tyranny under the forms of freedom; where, one hundred years after the feet of the last British red-coat polluted the

streets of Boston, British landlords and financiers impose upon American citizens a servitude compared with which the taxes of pre-Revolution days were merely a trifle.” (James Connolly, *Selected Writings*. Ed. by P. Berresford Ellis [1973], Pluto Press, 1997)

⁵³ James F. Eder, Jr., *On the Road to Tribal Extinction. Depopulation, Deculturation, and Adaptive Well-Being Among the Batak of the Philippines*, Berkeley, University of California Press, 1987.

tal outcome of the industrial revolution in the XIXth century. Indeed, humans live in a multiverse that is understood in mechanical metaphors—even though mechanicism is gone as a scientific paradigm. Orthodox psychiatry claims that neurosis is the most current ailment of the “civilized West,” but not anymore, now that tools and machines are operated by computers and machine-tools. Remember that while tools are adapted to humans, machines require the adaptation of humans: the former work *in vivo* while the latter work *ex vivo*. Yet there is more to come.

4.5. Thanatos—The Twenty-Fifth Hour

An alienating or even genocidal capitalism could theoretically leave nature untouched—something that is obviously out of the question. Capitalism’s total exploitation fosters nothing less than two biocides.⁵⁴ Upstream we find the instrumentalization of all forms of life, which generally amounts to their progressive destruction. For the “business class,” nature is just a big reservoir to plunder and a huge dustbin. As Huxley remarked: the love of nature keeps no factory busy. There is so much pollution in some areas that the life expectancy of humans has begun to decline, with health is more and more handicapped by pathologies such as asthma, diabetes, cancer, mental disorders, and genetic disorders.⁵⁵ Downstream, the transformation of nature into technical commodities also means the substitution of artificial life for natural life. Nature is outmoded, sometimes even deemed criminal: nothing should be free. Animals or plants reproducing themselves without any human intervention whatsoever is the nightmare of the corporate world. According to some, the biotechnology industry seeks the sterilization of all forms of life in order to substitute production for reproduction.⁵⁶

The conjunction of bio-technology with nano-technology and information technology irresistibly leads to the disappearance of the natural realm—entirely to the benefit of multinationals. Unfortunately, no dispassionate discussion of all “trans-”

issues seems possible (transhumanism, transsexualism, transgenderism...). The technological consequences for human beings are debated only within techn-optimist circles such as the transhumanists. This is nevertheless of tremendous philosophical relevance, since it amounts to the obliteration of the contrast between nature (“*physis*”) and art or artifice (“*technè*”) that roots the entirety of Western culture. Only Jean-Pierre Dupuy seems to have worked on this philosophical conundrum that was foreseen by Heidegger and Anders.⁵⁷ Here is the surest sign of a total cultural—hence civilizational—collapse. Interestingly, the existential consequences for human beings of technological innovation are only debated within technoptimist circles, such as the transhumanists. In other circles, ethicists are hired in order to sanction policies decided by technicians, something they happily do for only a small additional fee.

All this eerily reminds us of Huxley and Orwell, of course, but also, and perhaps especially, of Gheorghiu’s *Twenty-Fifth Hour*:⁵⁸ the twenty-fifth hour is an hour after the last hour; it is the time when nothing can be hoped anymore because machines, even though they haven’t taken power yet (Stephen Hawking recently expressed his concerns in that regard), are already ruling our lives and obliging us to think with their language. Dehumanization is irreversible. The power of Gheorghiu’s vision is impressive—it definitively matches Orwell’s, and it is all the more revealing of the human psyche that so few readers actually realize its depth. Who could plunge his eyes in Saturn’s gaze would actually venture himself into the margins of psychosis. In our actual twenty-fifth hour, humans live in an automated world that obeys the laws of the Market. Machine-tools are to be replaced by animal-machines (thanks to bio-technologies operating “*in vitro*”) and, as soon as possible, by animal-machine-tools (with the merging of bio and nano-technologies opening the “*in thanato*” gate).

Humans are now in palliative care, so to speak. The normal state of consciousness is basically the mesmerized state of the TV-spectator, and rationali-

⁵⁴ Jean-Pierre Berlan speaks of “*écocide*” (“*L’écocide, ou l’assassinat de la vie*”). Even positive externalities are usually ignored.

⁵⁵ See S. Jay Olshansky et al., “A potential decline in life expectancy in the US in the 21st century,” *New England Journal of Medicine*, 352, 2005, pp. 1138–1145; Claude Aubert, *Espérance de vie, la fin des illusions*, Paris, Éditions Terre vivante, 2006.

⁵⁶ Jean-Pierre Berlan, “Les OGM, la faim et l’Académie des sciences,” *L’Écologiste* N°7, Vol. 3, juin 2002, pp. 41–47.

⁵⁷ Jean-Pierre Dupuy, *Pour un catastrophisme éclairé: quand l’impossible est certain*, Paris, Éditions du Seuil, 2002. Cf. European Commission. Community Health and Consumer Protection, *Nanotechnologies: A Preliminary Risk Analysis*, www, 2004.

⁵⁸ C. Virgil Gheorghiu, *The twenty-fifth hour: a novel* [Ora 25, 1949]. Transl. from the Rumanian by Rita Eldon, London, Heinemann, 1950.

ty is split between the operational categories needed for the human-machine interface and the irrationality of the consumer's life. "Don't you see that the whole aim of Newspeak is to narrow the range of thought?"⁵⁹

5. History of Consciousness and History of Rationality

In conclusion, there is a history of consciousness. A minima, we have to contemplate the logical revolution that makes the West so proud of its achievements. Departing from muthos, in the VIIth century B.C.E., to embrace logos has allowed all forms of technique to embrace the natural and the cultural world and, eventually, to smother them. A maxima, it is the Neolithic revolution that should be questioned, as well as the bio-nanotechnological "singularity." They entail a change of consciousness that has been addressed by various authors such as Jaynes, Gheorghiu, Thoreau, Emerson, Tocqueville, etc.⁶⁰

The sharpening of operational rationality has involved a palpable impoverishment of consciousness over the ages. It no longer covers its initial wealth of perception, and at its baseflow, it sees the world as made of dead, extended bodies. Most human beings are trapped in a world of introspected abstractions fuelled by spectacular abstractions (see Descartes, as well as Debord). "It is the twenty-fifth hour. The hour of European civilization," as Gheor-

ghiu claims.⁶¹ So-called civilized people do not believe anymore in the virtues of the natural realm or in spirits. Machines reign unchallenged—even by ethics. This is not by any means a recent phenomena, as Jaynes shows. More recently, the industrial revolution has transformed our world and our psyches, which had otherwise been quite stable for thousands of years.

We have seen that scientists have obtained a new set of evidence of the hominization process that began, according to the most recent fossil and genomic data, 370,000 years ago with the split between the homo sapiens and the homo neanderthalensis. We sometimes also have a glimpse into aboriginal communities made up of anatomically and mentally fully modern human beings. Jaynes's narrative is not without flaws, but it exploits many little-known historical facts and raises important questions. His stance on hallucination, however, is particularly problematic, as he argues that hallucinations necessarily take place without reflexive thinking. (Jaynes would have enjoyed the recent fuss about neurotheology...) How can we assess Socrates's case in such a framework? Socrates did enjoy some form of interaction with his "daemon," and this did not prevent him either from reflexivity or from adequate social intercourse. Socrates knew his "voice" was heard only by himself; he had insight into his (lack of) condition. Hallucinations are actually far more common than previously thought, and they constitute a window into the broad awareness that humans used to enjoy. They can be triggered by many different contexts and devices, such as lack of sleep, lack of light (natural/artificial), entheogens, migraine, blindness,⁶² Parkinson's disease, dreams, sleep paralysis, epilepsy, alcohol, psychosis (schizophrenia...), post-traumatic syndrome, etc.

When the nature of rationality is genetically assessed, we obtain a problematic result. Jaynes provides elements for an inverted Bildungsreise of consciousness insofar as the specialization of consciousness involves a tremendous loss of depth and significance that largely explains the experience of the absurd in contemporary life. In everyday life, rationality is correlated with the zero state of consciousness, which makes it essentially structured by the principle of non-contradiction. The nature and

⁵⁹ "Don't you see that the whole aim of Newspeak is to narrow the range of thought? In the end we shall make thought crime literally impossible, because there will be no words in which to express it. Every concept that can ever be needed, will be expressed by exactly one word, with its meaning rigidly defined and all its subsidiary meanings rubbed out and forgotten. [...] Every year fewer and fewer words, and the range of consciousness always a little smaller. [...] The Revolution will be complete when the language is perfect. Newspeak is Ingsoc and Ingsoc is Newspeak." (George Orwell, *Nineteen Eighty-Four* [1949]. Introduction by Thomas Pynchon, London, Penguin Books, 2003, pp. 60–61)

⁶⁰ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, op. cit.; C. Virgil Gheorghiu, *The twenty-fifth hour* [1949]; Henry David Thoreau, *Walden or Life in the Woods*, Boston, Ticknoer and Fields, 1854; Ralph Waldo Emerson, *Nature: A Facsimile of the First Edition* [1836], intro. Jaroslav Pelikan, Boston, Beacon, 1985; Alexis de Tocqueville, *De la démocratie en Amérique* [1835], Paris, Robert Laffont, 1986.

⁶¹ Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, p. 165.

⁶² In Charles Bonnet syndrome, a person with partial or severe blindness experiences complex visual hallucinations.

import of rationality has evolved together with consciousness-zero: the understanding of consciousness that proceeds from substantialistic premises (again: the principle of identity, the principle of non-contradiction, and the excluded middle) must be relativized—not revoked.

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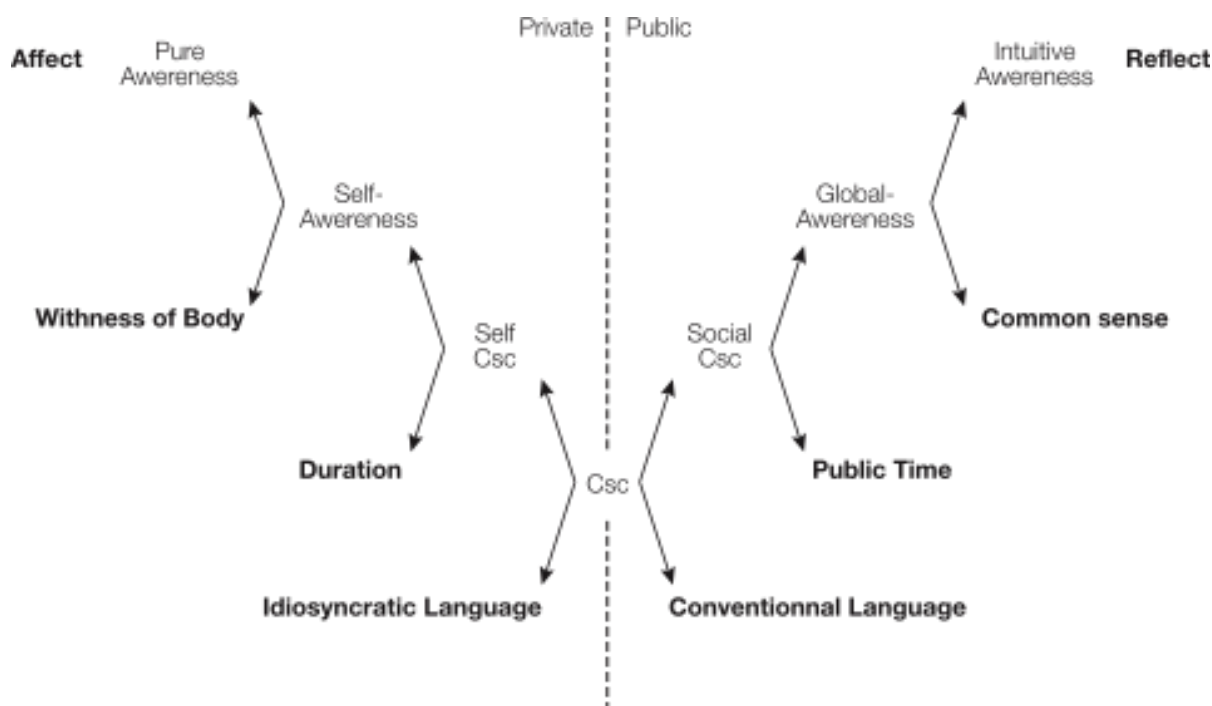
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Appendix



THE RATIONALITY OF METAPHYSICAL INTUITIONS IN THE CONSTRUCTION OF A SCIENTIFIC IMAGE OF THE UNIVERSE*

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Abstract:

The author argues that for the last 2,500 years, the science concerning the universe (o kosmoV) has been based on two metaphysical intuitions—the atomic one for more than 2,400 years, and the string intuition in the second half of the twentieth century.

Key words: atom, relativity theory, quantum theory, Big-Bang, string theory.

The construction of any image about the universe is based on a privileged choice of single elements—brick-elements—which build the image of the universe. Thus, for almost 2,500 years the image of the actual universe was built on Leucippus and Democritus' atomic intuition about the simplest elements that make up the present universe: “In an obvious respect the atomism of Leucippus and Democritus is closer than any of the rival Greek views to what we now identify as scientific thinking. Largely as a result of the intellectual demands implicit in technical developments it has been a major trend in post-Renaissance scientific thinking to take as an altogether basic concept the idea of quantifiable space...; the awareness and assumption of spatial relations is so deeply a part of all human experience that an utterly non-spatial kind of awareness is virtually unthinkable.”¹

Diogenes Laertius notes Democritus' opinions in his PERI BIWN, DOGMATWN KAI APOFQEGMATWN, TWN EN FILOSOFIA EUDOKIMHSANTWN, IX, VII, XI, 44: “Democritus holds the following opinions. The first principles of the Whole are atoms and the void; anything else is merely mental supposition. The worlds are infinite

in number; they come-to-be and perish. Nothing can come-to-be from nothing nor pass away into not-being. The atoms are infinite in number and in differences of size. As they are borne along in the universe they form vortices, and thereby they generate all composite things, which include fire, water, air, and earth; for these are conglomerations of certain atoms. Because of their absolute solidity the atoms are impassive and unchangeable.”²

On the atomic intuition, powerfully confirmed through the observation of facts and the use of rationality and common sense, scientific systems were built by Aristotle, Euclid, Newton, Niels Bohr, Albert Einstein, Werner Heisenberg, etc. These systems were considered exemplary foundations for science, and great boons to furthering human understanding of the universe.

For example, in his work *De Coelo*, Aristotle developed the theory of the spherical and immobile Earth in the center of the planetary system, because for mystical reasons—under the influence of geometric thinking in the pitagoreico-Platonic tradition—he considered circular motion and the sphere/circle to represent perfection.³ The quality of “perfection”—particularly intrinsic to Platonic conceptions concerning the divine—necessarily involved the finite and the definite, i.e. the assertive: “nor infinite or indefinite.” Aristotle completes the picture of physical reality—a protocosmos—as an ordered universe (o kosmoV) with an original sense given to the concept of “the infinite” (to apeiron, literally, the unlimited) with a double connotation: on the one hand the motion described by rotating a

* The present paper recovers an unfinished comparison stated in the author's research on the epistemology of physics.

¹ Philip Wheelwright (ed.), *The Presocratics*, New York, The Odyssey Press, 1966, p.175.

² *Apud* Philip Wheelwright (ed.), *The Presocratics*, New York, The Odyssey Press, 1966, p.196.

³ Aristotelis *De Coelo*, in: *Aristotelis Opera omnia*. Graece et Latine. Volumen I–IV, Parisiis, Editore Ambrosio Firmin Didot, Institutum Franciae Typographo, 1848–1857. Cum indice nominum et rerum absolutissimo, MDCCCXLVIII–M DCCCLIV, vol.2, MDCCCL, II.3.

ring on a finger, on the other hand, endless motion,⁴ still circumferential, but with a motionless center. As it concerns time, Aristotle and the entire Aristotelian tradition argued for the existence of absolute time, which is to say that the time interval between two events can be measured unambiguously, and that this interval is the same regardless of who measures it, provided a measurement unit is used.⁵ The Aristotelian conception of time (o cronoV) is completely separate and independent from space (o topoV).⁶ Aristotle also believed that all matter in the universe as a physical ordered reality (o kosmoV) was composed of four basic elements—earth, water, air, fire⁷—animated and moved by two opposing forces: weight (the characteristic tendency for earth and water) and ease (the characteristic of air and fire, which tend to rise).⁸

More than 1,900 years after Aristotle, Isaac Newton—without canceling atomic intuition, but emphasizing the basic atomic geometrization of space—synthesized the components of physical reality into a universe model where the concept of “quality” was suppressed, declaring it subjective and excluding it from nature. At the same time, Newton suppressed sensitive perception as a source of knowledge, and proclaimed intellectual knowledge, even *a priori*, to be the only means of apprehending the essence of the cosmos, thus showing something that nobody has ever shown before, namely that moving bodies in the universe obey the law of numbers.

Since 1623 Galileo formulated the thesis: “The book of nature is written in mathematical language and its characters are triangles, circles and other geometric figures without which it is impossible for people to understand a word.”⁹ This was a particularly revolutionary argument, since it destroyed the ancient image about physical reality conceived as a set of substances, shapes, and qualities.

Providing mathematical solutions to concrete physical problems—such as the problem of falling bodies, or the problem of the free movement of an

arrow, or projectiles in general—as a way to explain real existence by mathematical existence (e.g. physical bodies moving straight into an empty space are not real bodies moving in a real space, but mathematical objects that move in a mathematical space), led Isaac Newton to write his monumental work *Principia Mathematica Philosophiae naturalis* in 1686. Here Newton gave the most accurate approximation of how heavenly bodies are moving in space and time and explained the cause of elliptical orbits. Newton also developed a complex mathematical apparatus for the analysis of these movements—the theory of universal gravitation and the Newtonian model of the universe as a physical reality, infinite in space and infinite in number of stars, which are about evenly distributed in the infinity of space, connected in mechanical movement by the force of gravitational attraction. The Newtonian concept of physical reality is to be considered a static model of the universe, where movement has one quality—mechanical—and is external to objects, while the only force intrinsic to the bodies is gravity, which is a balancing force. The Newtonian structure of the universe is composed of infinitesimal quantities whose combinations are perfectly described by mathematical calculus in every moment in time and in every point of space.

The success of classical science, particularly the Newtonian theory of gravitation, led the French scientist Pierre Simon de la Place to claim that the universe as a physical reality—a cosmos—can be completely described by a mathematical apparatus (probability theory), and completely determined in a very precise sense, namely that the present state of the universe is the result of its previous state and the cause of its subsequent state.¹⁰

Mathematical physics exceptional position among the sciences on the universe, provided a very special status of theories, hypotheses and laws which it states. With Albert Einstein, science fell back on physical reality as the universe qualitatively different because of its different space and time and motion properties, in its different areas, depending on the agglomeration or dispersion of matter or energy, reproducing the image of a non-homogeneous and anisotropic universe.¹¹

⁴ *Ibidem*, II.4.-8.

⁵ Aristotelis *Physica*, Recognovit brevisque adnotatione critica instruxit W. D. Ross, Oxonii E Typographeo Clarendoniano, New York, Oxford University Press, 1950, D, 13. 222a.

⁶ *Ibidem*, D, 14. 223a-b.

⁷ Aristotelis *De generatione et corruptione*, in: Aristotelis *Opera omnia*, vol. 2, II. 1.

⁸ Aristotelis *Physica*, *ibidem*, Q, 7. 260b.

⁹ Galileo Galilei, *Il Saggiatore*, in: *Le Opere di Galileo Galilei*, Firenze, Edizione Nazionale, 1898, vol. 6, p. 232.

¹⁰ Simon-Pierre de la Place, *Essai Philosophique sur les Probabilités*, 2 vol., Paris, Gauthier-Villars et Cie, Editeurs, 1921, vol. 1, p. 3.

¹¹ Jacques Merleau-Ponty, *Cosmologie du XXe siècle*, Paris Gallimard, 1965, pp. 273-276.

Key in establishing a new metaphysics was the theory of general relativity, which deeply modified the mathematical description of the causal world, paving the way for seeing physical reality as specific object located within a framework defined *a priori* as a space-time structure, with properties that cannot be known other than by knowing their material content in their structure and distribution. The theory of general relativity provides the foundation for the unification of the cosmos into a physical-geometric whole, and for understanding it as a defined structure that allows the association of its content and its form by necessary relations. All these advances in physical theory are based on new developments of mathematical concepts related to space and infinity, especially on the generalizations and distinctions introduced by Georg Friedrich Bernhard Riemann between infinity as metric property of space, belonging to his inner relations, and infinity as its extrinsic property.

Until the twentieth century, no one had advanced the idea that the universe could have a natural history, i.e. a concrete beginning in a real time, or that the emerging physical reality could be expanding or contracting. Making use of the same metaphysical insights as Democritus, in 1917 Einstein built the first model of the universe based on the theory of general relativity—the first coherent representation of the universe that did not formally contradict the well-founded principles and laws of physics.

According to his point of departure—the general theory of relativity—Einstein's model analytically connects the state of matter with the metric structure (punctate, atomic) of space. Einstein's model has opened a new field of building for mathematics and physics, while reviving ancient philosophical debates about nature as a physical reality. His theory, although it does not totally and satisfactorily solve the cosmological problem, caused a general movement in physical thinking, and a revival of cosmological reflection in science and in the philosophy of nature.

At the same time, Einstein formulated a new type of reconstruction of cosmological theories characterized by a wide approach: cosmology was derived from general relativity through extrapolating principles applied to local phenomena of the universe, and extended to physical reality as a whole. This extrapolation needed to allow for the satisfactory reproduction of the principle features of the region observed, but relativistic cosmology remained

in a state of indeterminacy, since it left unanswered questions regarding both the geometrical shape of the universe and the temporal behavior of the cosmos. Today scientists describe the universe through two basic theories,¹² and in both Einstein's contribution is crucial. They are the theory of general relativity—which describes the macro structure of physical reality—and the theory of quantum mechanics, which describes the micro-universe. Unfortunately, both theories are incomplete and incompatible with one another, and cannot both be true at the same time.¹³ The great effort of post-Einstein physics is to integrate the two theories into a unified theory in order to unify relativistic gravity with quantum mechanics.

Edwin Hubble observed in 1929 that when looking anywhere in the universe, distant galaxies are moving away from the observer, which suggests that the universe is expanding, i.e. that long before the current time, celestial bodies were closer to each other.¹⁴

In the 1960s, Arno Penzias and Robert Wilson, following confirmed observations, posed the hypothesis¹⁵ that there was a time, ten or twenty billion years ago, when all matter of the universe was condensed in the same place, and therefore the density of the universe was infinite. From Penzias and Wilson's findings, Hubble inferred that there was a moment called the “Big Bang”¹⁶ in the history of physical reality, in which the universe was infinitely small and infinitely dense. At the time of the Big Bang, all the laws of physics, and consequently their full capacity to forecast the future, were meaningless. For physicists, what happened following the Big Bang became a very important question.

When the general theory of relativity states that there was a time in the history of physical reality when the primitive universe was so small that it could not be investigated, it suggests that it is necessary to provide a partial theory, even a limited one, in order to capably describe the state of the universe

¹² Jacques Merleau-Ponty, *Cosmologie du XXe siècle*, Paris Gallimard, 1965, pp. 112–113.

¹³ Stephen W. Hawking, *A Brief History of Time*, Toronto, New York, London, Sydney, Auckland, Bentam Books, 1988, p. 29.

¹⁴ *Ibidem*, p. 35 sq.

¹⁵ *Ibidem*, pp. 41–42.

¹⁶ Stephen W. Hawking, *A Brief History of Time*, Toronto, New York, London, Sydney, Auckland, Bentam Books, 1988, pp. 49–51.

after Big Bang.¹⁷ Werner Heisenberg formulated such a theory in 1927, launching the scientific arena of quantum theory.¹⁸

The theory of relativity allowed for a perspective in which space-time would have no borders, and in which it could be true that the boundary condition of the universe is that it has no limits. The universe would contain itself as the only physical reality, and it would not be affected by anything outside of it. The universe would be neither created nor destroyed. The universe could not be other than “in rotation,” with free travel in the past, as demonstrated by Kurt Gödel in the International Congress of Mathematics at Cambridge in 1950.¹⁹

Quantum mechanics is an exceptionally successful theory, and embraces almost all contemporary science and high technology—it governs the behavior of transistors, integrated circuits and microprocessors that are essential components of electronic computing machines, microelectronics, computing, communications, and artificial intelligence. The only areas of science in which quantum mechanics are not yet integrated are gravity and the huge-scale structure of the universe. In the current development of science, Quantum mechanics is the only theory capable of consistent answers to questions about the initial state of the universe, and the only one that provides a rigorous model for composition, energy, and motion of matter in the universe.

Selecting convenient points in time, Werner Heisenberg makes obvious changes to the meaning of the term “nature” (the universe), from considering it as a work of God, to “nature” (the universe) understood as a common name for all areas of experience in which humans can penetrate with the help of natural sciences and technical means, independently of whether they are given in experience as “nature.”²⁰ From the naive atomistic intuition of reality structures “a new situation arises in modern sciences” in which “we can no longer consider in itself the building stones” of the universe—atoms—“which were previously understood as the ultimate objective

reality,” because of the fact that they escape from any fixed locations in space and time. “As a final consequence, the natural laws formulated mathematically in quantum theory no longer deal with elementary particles themselves, but with our knowledge of them.”²¹

However, it can be seen through the history of science that revolutions in science are the result of applying brilliant ideas conceived by scholars of philosophy. The discovery of relativity has entailed a profound effort of imagination to move beyond current conceptions of space and time, and quantum mechanics owes its emergence to the rejection of Bohr's atomic model and its replacement with Louis de Broglie's idea about the wave nature of matter. The revolutionary ideas of de Broglie and Erwin Schrödinger's development in the form of wave mechanics betray no sign of positivism. Likewise, Einstein's theory on Brownian motion illustrates the idea of speculative reality by the fact that collisions of elementary particles, as their oscillations are seen by scientist at microscope, take place (are described) in accordance with equations highly speculative of kinetic gas theory.²²

The scientist has relatively easily acquired his image about the ordered universe (o kosmoV) as his logical model of production and understanding, where the point and its sequence are primitive elements in Euclid's geometry. So, the motion of a point generates a line; the movement of a line generates a plane; the motion a plane generates a cube—the perfect model of three-dimensional space. But further, we can hardly imagine how we should move a cube to create a space with an extra dimension, etc. But do we need such a reality, or image, or multidimensional picture? Exactly how can we exist in four dimensions? Or how can there be a non-Euclidean world in three dimensions?²³

A final theory about the universe as cosmos dares to answer these questions based on the second metaphysical intuition in 2,500 years, made rational in the scientific tradition by the help of a new mathematical apparatus, i.e. (super)strings theory.

¹⁷ Jean Audouze, *Aujourd'hui l'Univers*, Paris, Belfond, 1989, pp. 100–114.

¹⁸ Jan Hilgevoord and Jos Uffink, *The Uncertainty Principle*, in: Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy*, Spring 2014 Edition, <http://plato.stanford.edu/entries/qt-uncertainty/#Aca>.

¹⁹ Jacques Merleau-Ponty, *Cosmologie du XXe siècle*, Paris Gallimard, 1965, pp. 276–283.

²⁰ Werner Heisenberg, *The Physicist's Conception of Nature*, transl. by Arnold J. Pomerans, London, Hutchinson & Co., 1958, pp. 8–12.

²¹ Werner Heisenberg, *The Physicist's Conception of Nature*, transl. by Arnold J. Pomerans, London, Hutchinson & Co., 1958, p. 15.

²² F. S. C. Northrop, *Introduction to: Werner Heisenberg, Physics and Philosophy*, London, George Allen&Unwin LTD, 1959, pp. 11–31.

²³ Ernest H. Hutten, *The Language of Modern Physics*, London, George Allen&Unwin LTD, New York, The MacMillan Company, 1956, p. 116.

Until now, the common foundation between the relativistic and quantum theories had been their philosophical problems, namely attempts to describe the initial state of the universe and its subsequent evolution after Big Bang through totally reformulated concepts of space-time, motion, causality, and composition, which highlighted the need for a new mathematical apparatus.²⁴

The metaphysical assumption of the quantum electro-dynamic theory is the punctate appearance of the space-time continuum. At each point, the load quantities are described by a pair of complex numbers as vectors in a fictional space. The presence of numerous descriptive mathematical groups suggests that the last description of reality is still obscure, with the one exception of a position that was posed by Michael Green and John Schwarz in 1984, and has gradually become more and more accepted. This is the (super) strings theory,²⁵ which asserts that the brick-elements of the universe are not atoms, but particles in the form of string. Superstrings theory provided a deeper understanding of matter and the generated universe as primordial and fundamental realities, and it is the resistance element of high-energy physics, resulting from experimental observations of huge particle accelerators where conditions similar to those immediately subsequent to Big Bang were recreated. What Superstrings theory aims to do and eventually realizes—at the cost of an almost absolute speculative leap—is the unification of fundamental forces and an explanation of unified symmetry at a high temperature—the temperature close to or identical with the Big Bang temperature—as the “hiding” or the “breaking” of symmetry links in accordance with the decrease in energy, i.e. the manifestation of the trend lines in nature, the so-called anomalies.

Unlike quantum theory, in which space-time was adequately represented by a lot of dimensionless points, the fundamental metaphysical assumption of superstrings theory is that basic particles are not points, but one-dimensional short strings.

Superstrings theory proves exceptional for unifying theories.²⁶ It allows the successful merging of

general relativity with quantum theory, it unifies the fundamental energies, and it describes the intrinsic structure of space-time from the scale of 10^{-33} cm to the Big Bang, when the universe had ten “natural” dimensions. The theory also explains the symmetry “breaks” at low energies.

Superstrings theory fails to explain one “strangeness,” i.e. that of the ten primary dimensions. Six dimensions remain wrapped in the current universe itself after Big Bang, while the remaining four are developing macroscopic dimensions. Hence another seemingly meaningless conclusion, namely that the allowed vibrations of closed strings—in a clockwise direction—not only describe objects with subatomic particle properties, but also objects with a negative probability of occurrence. In accordance with the principle of symmetry, these objects are called “shadows.” If superstrings theory is correct, it seems to imply the existence of a shadow universe along with the familiar one which has its own matter and forces, but is invisible to us. And if this parallel universe has one common adherence to our universe—gravity—then its presence would deeply affect the early development of our own universe at a macrocosmic scale, even the current structure of our universe observed today. The shadow universe is a strangeness that would in the same manner deepen our understanding of the universe through a theory that began with an attempt to quantify gravity—based on the atomic intuition—and eventually led to the discovery of a whole second universe using a second intuition, namely the string one.

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ON THE ALLEGED INDISPENSABILITY OF INTUITIONS IN PHILOSOPHY

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Abstract:

It is sometimes claimed that intuitions are an indispensable part of the evidential support provided for, or against, philosophical theses concerning a wide range of topics. This view is ingeniously argued for by George Bealer. His approach is based on a close connection between the modal nature of philosophy and the indispensability of intuitions as sources of modally-oriented evidence. This paper is aimed at a critical assessment of this approach. It is claimed that philosophy, though being modal at bottom, need not rely on (modal) intuitions as sources of evidence. In particular, it is shown (i) that at least some of Bealer's crucial philosophical arguments do not rest on intuitions as evidence and (ii) that one may find modal philosophical claims of considerable importance that do not require modal intuitions for support. As a result, (modal) intuitions need not be considered indispensable for gaining philosophical knowledge, even when philosophy is understood along Bealer's lines.

Key words: Argument against empiricism, evidence, George Bealer, intuition, philosophical knowledge, rigid designation.

1. Introduction

When one argues for or against a philosophical thesis, one sometimes cites various kinds of intuitions for or against that thesis. It might even seem that talk of intuitions is rather ubiquitous in philosophy. One might gain the impression that intuitions are an indispensable part of the evidential support provided for or against philosophical theses concerning a wide range of topics.

Herman Cappelen has been so dissatisfied with the contemporary philosophical methodology being

overfilled with intuition talk that he wrote a whole book against what he called the *Centrality Thesis*:

Contemporary analytic philosophers rely on intuitions as evidence (or as a source of evidence) for philosophical theories. (Cappelen 2012, 3)

Cappelen claims that the Centrality Thesis is simply wrong, and that meta-philosophers incorrectly describe the actual methodological practice employed in first-order philosophy. He claims that philosophers "are promiscuous in the kinds of data and evidence they allow themselves to draw on when answering philosophical questions" (Cappelen 2012, 190), meaning that philosophers employ sources of evidence as varied as observations, scientific results, thought experiments, experience, argumentation, common sense, etc. Cappelen argues that despite uttering the term 'intuition' and its kin, first-order philosophers do not need, and do not use, intuitions as (a source of) evidence.

Timothy Williamson seems to be less skeptical. Though admitting that "[i]ntuition' plays a *major* role in contemporary analytic philosophy's self-understanding" (Williamson 2007, 215; my italics), he voiced a rather down-to-earth opinion about the role of intuitions in philosophy. According to him, intuitions are a sort of *pis aller*:

When contemporary analytic philosophers run out of arguments, they appeal to intuitions. It can seem, and is sometimes said, that any philosophical dispute, when pushed back far enough, turns into a conflict of intuitions about ultimate premises: "In the end, all we have to go on is our intuitions." Thus intuitions are presented as our evidence in philosophy. (Williamson 2007, 214)

Contrary to Cappelen, Williamson seems to admit that philosophers do use intuitions as evidence; however, the role he assigns to intuitions is rather meager: they are invoked in philosophy because philosophers cannot be better off.

There are a number of meta-philosophers who are much more enthusiastic about intuitions than Cappelen or Williamson. For example, Joel Pust claims that “much contemporary philosophical theorizing proceeds as though intuitions of various kinds constitute evidence for and against the truth of a philosophical theory” (Pust 2000/2012, 1) and that “intuitions are treated as the fundamental evidence or data in much of contemporary philosophical theorizing” (Pust 2000/2012, 29). Alvin Goldman and J. Pust argue that “[a] theory is commonly judged lacking when it fails to ‘capture’ our intuitions and judged acceptable insofar as it captures more of our intuitions than other extant theories” (Goldman-Pust 1998, 179).

The final example of an intuition-based conception of philosophy is the one propounded by George Bealer:

It is truistic that intuitions are *used* as evidence (or reasons) in our standard justificatory practices. For example, in elementary logic, number theory, and set theory. In philosophy, the use of intuitions as evidence is equally ubiquitous. Just recall the Gettier examples, Chisholm’s perceptual relativity refutation of phenomenalism, the Chisholm-Geach-Putnam refutations of behaviorism, all the various twin-earth examples, Burge’s arthritis example, multiple-realizability, etc., etc. Each of these involve intuitions about whether certain situations are possible and whether relevant concepts would apply. (Bealer 2000, 2)

According to Bealer, intuitions are an indispensable part of what he calls our standard justificatory practice in philosophy. In fact, Bealer argues that ignoring intuitions as a source of evidence in philosophy amounts to adopting a self-defeating position; thus, there is no coherent philosophical position which could be established without adopting intuitions as a source of evidence.

Bealer’s views on intuitions and their role in philosophy are very detailed and well established. They are deeply intertwined with his overall reflections on philosophy and its role in human cognition. Being an integral part of a much broader

project, Bealer’s views on intuitions thus receive a rather high degree of credibility. In what follows, I am going to discuss them in some detail. To begin with, I shall outline some fundamentals of Bealer’s project and the role assigned to intuitions therein (Section 2). I am going to claim that since Bealer views philosophy as modal at bottom, modal intuitions are considered to be the most important ones for gaining philosophical knowledge. Having provided the fundamentals of Bealer’s theory, I will proceed to criticisms. In particular, I shall try to show that some of Bealer’s crucial philosophical arguments do not rest on intuitions as evidence (Section 3) and that one may find modal philosophical claims that do not require modal intuitions for support (Section 4). As a result, (modal) intuitions need not be considered as indispensable for gaining philosophical knowledge, even when philosophy is understood along Bealer’s lines.

2. Bealer on Intuitions

Bealer presents his views on intuitions as a part of a wider project concerning the role of philosophy in human cognition. For him, philosophy provides a self-sustained kind of knowledge largely independent of the sciences and irreducible to scientific knowledge. This view is encapsulated in two related theses, (cf., e.g., Bealer 1992, 121; 1996a, 121; 1996b, 1; 1998, 201):

The Autonomy of Philosophy Thesis: Among the central questions of philosophy that can be answered by one standard theoretical means or another, most can in principle be answered by philosophical investigation and argument without relying substantively on the sciences.

The Authority of Philosophy Thesis: Insofar as science and philosophy purport to answer the same central philosophical questions, in most cases the support that science could in principle provide for those answers is not as strong as that which philosophy could in principle provide for its answers. So, should there be conflicts, the authority of philosophy in most cases can be greater in principle.

When philosophical problems are going to be solved, the sciences cannot do better than philosophy itself does. This is not to say, of course, that philosophy does not, and need not, cooperate with the sciences. On the contrary, philosophical theories and beliefs may gain considerable support

from the sciences. Rather, what Bealer claims is that there are central philosophical questions concerning such notions as knowledge, mind, meaning, identity, concept, etc. which can be answered only by distinctive philosophical methods. In the case of many non-central questions, however, philosophy is allowed to borrow evidence from the sciences.

The fact that philosophy needs its own distinctive methods and sources of evidence that cannot be replaced by scientific ones follows quite naturally from certain observations scattered about in various places in Bealer's works: The sciences investigate what is actual, i.e. how the things are (or were or will be) in the actual world. On the other hand, philosophy is modal at heart, because it is concerned not just with what is actual, but also with what is possible, necessary, impossible, etc. Given their non-modal character, and despite their success in obtaining knowledge, the sciences do not need, and do not have, justificatory procedures that could be used to justify modal claims. Consequently, philosophy needs its own justificatory procedures capable of providing justification to its modal claims. This is not to say, obviously, that philosophy cannot also employ some other justificatory procedures that are non-modal. But what makes philosophy such a distinctive intellectual activity from the sciences is the fact that philosophy employs intuitions as sources of evidence.¹ Most notably, since philosophy is modal, it is modal intuitions that have to be used in philosophical cognition. In Bealer's words, modal intuitions are "the most important class of intuitions for philosophy" (Bealer 1998, 213).²

¹ An analogous idea is propounded by A. Goldman: "One thing that distinguishes philosophical methodology from the methodology of the sciences is its extensive and avowed reliance on intuition. Especially when philosophers are engaged in philosophical 'analysis,' they often get preoccupied with intuitions. To decide what is knowledge, reference, identity, or causation (or what is the concept of knowledge, reference, identity, or causation), philosophers routinely consider actual and hypothetical examples and ask whether these examples provide instances of the target category or concept. People's mental responses to these examples are often called 'intuitions,' and these intuitions are treated as evidence for the correct answer. At a minimum, they are evidence for the examples' being instances or non-instances of knowledge, reference, causation, etc. Thus, intuitions play a particularly critical role in a certain sector of philosophical activity." (Goldman 2007, 1)

² The specific role of modal intuitions is also pinpointed by Ernest Sosa (cf. Sosa 2007, 101).

Intuitions—or, rather, their contents (cf. Bealer 1998, p. 205)—provide philosophers with a distinctive kind of evidence. In particular, "[i]ntuition is the source of all noninferential a priori knowledge" (Bealer 2004, 12). Intuitions are a special kind of rational seemings (cf. Bealer 1992, 101; 1998, 207; 2004, 12–13), which means that when one intuits that *p*, it seems to one that *p*, where seeming is a genuine kind of conscious episode. In this sense, "intuition is a *sui generis*, irreducible, natural ... propositional attitude that occurs episodically" (Bealer 1998, 213). Because of their *sui generis* nature, intuitions cannot be reduced to other kinds of propositional attitudes such as beliefs (cf. Bealer 1992, 102; 1998, 208; 2000, 3–4; 2004, 13), judgments, guesses, hunches, etc. (cf. Bealer 1992, 103; 1998, 210).³

Importantly, intuitions—qua sources of evidence—are basic in the sense that they are irreducible to other sources of evidence (cf. Bealer 1996a, 7ff; 1998, 217ff).⁴ This is not to say, of course, that intuitions must be infallible. Bealer admits their fallibility, but claims, at the same time, that this fact does not undermine their status of being a source of evidence (cf. Bealer 1992, p. 104; 2004, p. 23). Erroneous intuitions can be eliminated from

³ Bealer's views on intuitions as propositional attitudes *sui generis* differ from those of some other philosophers. Some philosophers think that intuitions are beliefs of any sort or of some special sort (see, e.g. Plantinga 1993; van Inwagen 1997). Some others think that they are mere opinions (see, e.g. Lewis 1983). The view that intuitions are *sui generis* is shared by J. Pust (cf. Pust 2000/2012).

⁴ Bealer's *modal reliabilism* explains what it means for a source of evidence to be basic. He claims that "a candidate source of evidence is basic iff its deliverances have an appropriate kind of strong modal tie to the truth" (Bealer 1998, 217). There are various possibilities as to how to construe a modal tie to the truth. One option is to take it as a sort of an infallibilist tie (in a strong sense: "a candidate source is basic iff, necessarily, all deliverances of the source are true"; in a weaker sense: "a candidate source is basic iff, necessarily, for anyone in ideal cognitive conditions, the deliverances of that source would be true"; Bealer 1998, 218). Bealer suggests that we should opt for the weakest kind, which does the job required. His final suggestion is: "a candidate source is basic iff for cognitive conditions of some suitably high quality, necessarily, if someone in those cognitive conditions were to process theoretically the deliverances of the candidate source, the resulting theory would provide a correct assessment as to the truth or falsity of most of those deliverances" (Bealer 1998, 219). Under this construal, phenomenal experience and intuitions come out as basic, while other sources—such as testimony or memory—come out as non-basic.

the stock of intuitions available to a person by some kind of a priori dialectic.

The basic nature of intuitions can be supported by a simple argument (cf. Bealer 1998, 217–218). Let us assume that intuitions are non-basic, i.e. that they are derived from some other sources of evidence. It holds that “something is a derived source of evidence relative to a given subject iff it is deemed (perhaps mistakenly) to have a reliable tie to the truth by the simplest comprehensive theory based on the subject’s basic sources of evidence” (Bealer 1998, 217). If intuitions were derived, the simplest comprehensive theory based on basic sources of evidence may invoke merely empirical sources such as observation, phenomenal experience, etc. Such a theory could explain empirical evidence only and, thus, has to be free of all modal claims. Therefore, such a theory could not establish a reliable tie between modal intuitions (which are non-empirical) and the truth. Since this is contrary to what was required, (modal) intuitions cannot be taken as non-basic sources of evidence. And since it has already been accepted that they must be a source of evidence, they must be a basic source.

To sum up, Bealer views modal intuitions as indispensable in philosophy because philosophy concerns itself with modal aspects of the world. Philosophical claims, most notably those that are either explicitly or implicitly modal, must be supported by suitable modal intuitions. Otherwise such claims cannot be taken as expressing knowledge. Given this conclusion, it might be interesting to ascertain whether Bealer’s view about the indispensability of intuitions stands up to tests. In what follows, I present two considerations demonstrating that (modal) intuitions are not necessary to obtain philosophical knowledge.

3. Intuitions and Bealer’s Argument against Empiricism

Bealer’s considerations concerning the evidential role of intuitions in philosophy are a piece of philosophy—indeed, a very good a piece of philosophy. It should be highlighted that Bealer himself often cites intuitions to support his own philosophical claims. Now one of his central arguments suggesting that intuitions are evidence in philosophy includes the claim that empiricism is a self-defeating doctrine (cf. Bealer 1992; 2000, 5–7). Despite being an argument of considerable philosophical significance, it seems to me that, as

developed by Bealer, it does not rest on intuitions. If this is the case, then we have an important argument that is free of intuition talk. Let us look at the argument more closely.

To begin with, Bealer presents empiricism as holding the following three principles (cf. Bealer 1992, 99; 2000, 5):

- A. *The Principle of Empiricism*: A person’s phenomenal experiences and/or observations comprise the person’s evidence.
- B. *The Principle of Holism*: A theory is justified (acceptable, more reasonable than its competitors, legitimate, warranted) for a person iff it is, or belongs to, the simplest comprehensive theory that explains all, or most, of the person’s evidence.
- C. *The Principle of Naturalism*: The natural sciences (plus the logic and mathematics needed for them) constitute the simplest comprehensive theory that explains all, or most, of a person’s phenomenal experiences and/or observations.

Now Bealer develops an ingenious argument demonstrating that the three principles lead to a self-defeating position. He claims that the problem lies in the first principle, the other two being quite unproblematic and acceptable. The argument can be summarized as follows (cf. Bealer 2000, 5):

1. A theory is justified for a person iff it is, or belongs to, the simplest comprehensive theory explaining all, or most of the person’s phenomenal experiences and/or observations. [From A and B]
2. A theory is justified for a person iff it is, or belongs to, the natural sciences. [From C and 1]
3. The underlying logic needed for the simplest regimented formulation of the natural sciences is just elementary extensional logic. [Empiricist assumption]⁵
4. A theory is justified for a person iff it is, or belongs to, the simplest regimented formulation of the natural sciences using elementary extensional logic. [From 2, 3]
5. Principles A–C involve terms such as ‘justified,’ ‘simplest,’ ‘theory,’ ‘explain,’ ‘evidence.’ [Observation]
6. The terms ‘justified,’ ‘simplest,’ ‘theory,’ ‘explain,’ and ‘evidence’ neither belong to, nor are defined within, the vocabulary of the

⁵ This assumption is central to Quinean versions of empiricism. Bealer primarily discusses these positions.

simplest regimented formulation of the natural sciences. [Observation]

7. Thus, principles A–C do not belong to the simplest regimented formulation of the natural sciences. [From 5, 6]

8. Thus, principles A–C are not justified. [From 4, 7]

In other words, empiricism is not able to comply with the very requirements it imposes on theories in general. In this sense, empiricism is self-defeating.

When one inspects the derivation of Bealer's conclusion more closely, one may see that there is no trace of intuitions in the argument. What we have here are just certain assumptions which are either definitional or based on simple observations and generalizations thereof. For example, principles A–C can be regarded as definitional assumptions underlying empiricism. The same holds for the empiricist assumption in line 3. Lines 5 and 6 involve mere observations, which can be gathered by inspecting the empiricist language. The rest is just logical inference. One thus derives a significant philosophical thesis from premises that are free of intuition talk.⁶

Now one may argue that the above line of reasoning is not quite legitimate. One reason is that when Bealer suggests that intuitions are indispensable in philosophy, he has in mind what can be called first-order philosophy (to use Cappelen's term) rather than meta-philosophy.⁷ The above argument is meta-philosophical because it does not tell us anything about philosophical notions such as truth, knowledge, evidence, identity, meaning, etc.; rather, it tells us something about philosophical theories concerning these topics. Another reason may consist in that Bealer established a link between modal philosophical claims and (modal) intuitions. It might be claimed, thus, that intuitions must be taken as evidence in the case of modal claims only. However, there are no modalities in the above argument. As a result, we

have no right to criticize Bealer for failing to adhere to his own methodology.

Let us admit both criticisms. To show that intuitions are not indispensable in philosophy thus amounts to showing that there are first-order philosophical claims such that they are both modal and supported by intuition-free sources of evidence. There are a number of such claims that pop immediately into one's mind. I here select one of them which I take to be rather appealing; other philosophical doctrines could be, perhaps, handled along similar lines.

4. Modal Intuitions Eliminated

According to Saul Kripke, we have a natural intuition that proper names are rigid designators (cf. Kripke 1980, 5). The claim that proper names are rigid designators is implicitly modal. This becomes obvious as soon as one "translates" it into something less loaded with theoretical terminology. At the very outset, let us fix some notions. An expression is a rigid designator provided it refers to the same object in all possible worlds.⁸ The term 'possible world' is used to designate a possible state-of-affairs which is maximal in the sense that for all objects, all properties, and all relations, it specifies whether an object exemplifies a given property or not, and whether a given tuple of objects exemplifies a given relation or not. Thus, objects exemplify properties and relations only relative to possible worlds. Now to claim that proper names are rigid designators can be taken as meaning that a proper name is a referential linguistic device that can be used to refer to the same object regardless of the properties (and relations) the object exemplifies. As a result, whenever the object undergoes some change or other (in the sense that it acquires a new property or loses some of its old properties), the referential link between the name and the object named remains untouched; the name still names the object in question. One may see that the intuition that proper names are rigid designators is modal because it concerns what is the case in both actual and counterfactual situations. In other words, this claim describes proper names and their referential behavior in any imaginable situation.

Let us take this intuition as an example of a modal intuition. Such an intuition is, according to

⁶ Instead of discredited empiricism, Bealer suggests a version of *moderate rationalism* which also admits, over and above phenomenal experience and observation, intuitions as sources of evidence (cf. Bealer 1992, 126; 2000, 7). Principle A should be adjusted along these lines, and the resulting theory would not be self-defeating according to Bealer's lights.

⁷ Recall Bealer's claim that intuitions are indispensable when one seeks answers to *central* philosophical questions; obviously, central philosophical questions belong to first-order philosophy.

⁸ This formulation is rather simplified. However, it suffices for our purposes because, when it comes to proper names, it is by far the most satisfactory one; cf. (Zouhar 2012) for discussion.

Bealer, a priori, non-inferential, and irreducible to something else. It is a truism that we cannot observe how proper names behave in counterfactual situations. All we have at our disposal is how we, the actual speakers, use them in actual communication exchanges. This might be a strong reason for conferring an a priori and non-inferential status to the idea that proper names are rigid designators. Obviously, this is the case if one accepts the assumption that the way actual speakers actually use proper names to refer to something cannot reveal anything about the way proper names are used in counterfactual situations. This assumption coheres with Bealer's idea that modal intuitions cannot be derived from empirical claims about what is actually the case.

I am going to show that the idea that proper names are rigid designators need not be taken as having an intuitive background, let alone an irreducible and a priori one. Instead, it could be treated as an ordinary generalization derived from observation and linguistic experience. For even if one accepts that modal claims cannot be derived from non-modal empirical claims only, there is still room left for their derivation from empirical claims plus some other assumptions of a different sort. If I am right, then what Bealer calls modal intuitions may be, in fact, inferred claims. Given this possibility, the assumption that the actual practice with proper names reveals nothing about a possible practice in counterfactual situations is unjustified.

We are inductive creatures. We are accustomed to deriving generalized claims about something on the basis of some rather meager inputs. It often happens that when one faces a certain situation, one is able to predict—on an inductive basis—that a fairly similar situation may occur as well. In the case of our communication practices featuring proper names, it amounts to the following. Let us admit that a person P is exposed to ordinary communication situations in which proper name N is used to refer to the object O.⁹ More precisely, P is exposed to

various utterances featuring N at various times T₁, T₂, T₃, etc. For P, these occasions provide the basis for empirical observations concerning the way N behaves in communication. Now, what is crucial is that O changes over time, and P is able to observe this change (or knows or believes that such changes occur). As a result, there is some property Q₁ which O instantiates at T₁ but fails to instantiate at T₂.¹⁰ P observes that N is used to refer to O regardless of instantiating Q₁. An analogous situation also appears with respect to some other properties Q₂, ..., Q_m. P observes that N is still used to refer to O despite the fact that O fails to instantiate Q₂, ..., Q_m, the properties it used to instantiate previously. Consequently, P generalizes that instantiating Q₁, ..., Q_m is irrelevant for N being a name of O.

So far we have considered a number of actual situations in which P took part as an observer. P may now undertake an inductive step. On the basis of the observed uses of N, P is able to guess what happens in other occasions in which P is not present. Upon observing that N was used to refer to O even in the case O that has lost properties Q₁, ..., Q_m, P derives that N will be used to refer to O even in the case that O will lose property Q_{m+1}. An example might be an actual communication situation in which someone uses N to refer to O while P is absent. The inductive step in P's reasoning consists in that she arrives at the following generalization: with respect to any actual utterance of N in any actual communication situation, N is used to refer to O irrespective of any of the properties O exemplifies in a given situation.

This inductive step takes us from the observed situations in which N has been used to refer to O to unobserved, but still actual, situations in which N is used to refer to O. However, an analogous step can also be undertaken with respect to any situation in which N is, or could be, used to refer to O. From the phenomenal point of view, there is no difference for P between the case of an actual, though unobserved use of N and the case of a non-actual use of N. As a result, P may consider the situations in which O were to lose some of its properties and still would be referred to by N; however, P may also consider a counterfactual situation which has not yet happened

⁹ Obviously, a number of other assumptions must be satisfied as well: (i) the communication situations P is exposed to involve *correct* and *unambiguous* utterances produced by competent speakers of a given language; (ii) these speakers master N such that they are able to use N and understand others' uses of N; (iii) P knows that they have mastered N and takes them as reliable authorities in this connection; (iv) the utterances featuring N involve N as used rather than mentioned; (v) P is a competent speaker of a given language; (vi) when faced with the

utterances involving N, P recognizes N as a proper name; etc. etc.

¹⁰ For the sake of simplicity, I consider merely the situations in which O loses some properties; we may also consider the situations in which O acquires properties it has not instantiated previously. Anyway, the gist of the argument is untouched by this simplification.

and guess that N would be used to refer to O in such a situation as well. P might simply imagine what would happen to the referential link between N and O provided there is a non-actual situation in which N is uttered but O forfeited some of the properties it actually does exemplify. Thus, P takes one more inductive step and generalizes her previous actual observations to non-actual communication situations. P is able to undertake such a step merely on the basis of her previous linguistic experiences, together with the assumption that what has happened in certain actual situations in which N has been used to refer to O may happen also in counterfactual situations in which N will be used to refer to O.

To sum up, on the basis of the actual and envisaged utterances of N, P is able to guess what happens to N's reference in other actual, but unobserved situations.¹¹ N is also able to guess what happens in any unobserved situation, whether actual or merely possible, though non-actual. As a result, it can be shown that what was claimed to be a modal intuition could be, in fact, derived from empirical observations concerning actual uses, provided they were supplemented with something else, namely with the inductive assumption which guides the person's ability to arrive at generalizations of various sorts. The claim that proper names are rigid designators, albeit modal at bottom, can be taken as an ordinary inductive generalization that is on a par with other inductive generalizations.

Now, one might object that the above considerations are not as successful in eliminating intuitions as one supposes. Even though one admits that the claim that proper names are rigid designators is not intuitive at its face value, it could be objected that the crucial step, namely the one consisting of employing the inductive assumption, is based on intuitions. The claim would, thus, be derived on the basis of some other intuition. In other words, the inductive assumption could be taken as intuition. However, this criticism goes too far. A lot of scientific claims are supposed to be based on an inductive generalization. In such a case, the sciences should have an intuitive basis as well; this goes against those philosophers, including Bealer himself, who adopt the view that there are profound methodological differences between philosophy and

the sciences. To preserve these differences, the inductive step should be, rather, regarded as a mere assumption that was proved successful in the past and is expected to be such in the future as well. Being an assumption is not the same as being an intuition.

5. Conclusion

Admittedly, philosophy is modal at bottom. This fact, however, does not require that there must be a special kind of intuition which provides an evidential basis for modal claims. What is required, rather, is the admission of certain assumptions which are neither supposed to be intuitions nor supposed to be based on intuitions. Philosophical claims do not require (modal) intuitions as their evidential support. If it seems that they do, I believe that the philosophical claims rest on an assumption which is not, or need not be, further justified (for a wide variety of reasons, such as pragmatic reasons, technological limitations, etc.). To say that such an assumption is, in fact, an intuition is both unnecessary and unrevealing. Such a label merely creates an illusion that the assumption is endowed with a special epistemic status and is somehow exceptional in comparison to other claims put forth in the process of human cognition.

If it holds that philosophical claims do not require modal intuitions as their evidential support, there would be no essential difference between philosophical methodology and scientific methodology. Of course, as there are various sources of evidence which can be used in one scientific field, but cannot be utilized in another one, so there are various sources of evidence invoked in the sciences that are not, and could not, be employed in philosophy, and vice versa. Anyway, this fact cannot be used to create an insurmountable methodological gap between philosophy and the sciences. Bealer, Goldman, and others wanted to have such a gap because of the alleged indispensability of intuitions in philosophy. If one is not motivated to find some room for intuitions, one may arrive at a more mundane view on philosophy that will not assume methodological gaps between philosophy and the sciences.

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¹¹ P may thus guess that the referential link between N and O is not broken during P's absence. In other words, existence of the link is not dependent on P's presence in the respective communication situations in which N is used.

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THE INDISPENSABILITY ARGUMENT(S) FOR INDUCTION

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Abstract:

Developing the ideas presented in Jacquette (2011), the paper presents an indispensability argument aimed at justification of induction. First, Hume's problem of induction is introduced via slightly different reconstructions. Second, several traditional attempts to solve Hume's problem are presented. Finally, Jacquette's (2011) proposal to justify induction by an indispensability argument is developed. I conclude with presenting a kind of indispensability argument for induction.

Key words: generalization, Hume's problem of induction, induction, indispensability argument, Jacquette, justification, observed, unobserved.

1. Introduction

If you ask philosophers what they think about induction—if there is any such kind of reasoning, or if there is one, whether it is reliable in some methodologically interesting sense—you find various different answers, ranging from optimistic to skeptical. The aim of this paper is to offer a certain kind of argument which seems to show that even if we realize the possibility of a disruption of some inductively inferred regularity, the very thinking of such a change presupposes that certain other parameters have to remain fixed (or unchanged). The argument I propose in the final section owes much to Dale Jacquette's considerations on indispensability arguments (see Jacquette 2011).

However, the structure of the paper is a bit broader. In section 2, I commence with several different, although some very close, reconstructions of Hume's argument, traditionally dubbed "the problem of induction" or "Hume's problem of induction." Then, in section 3, I proceed by presenting

some of the representative (although unsuccessful) attempts to solve this problem. Section 4 brings out Dale Jacquette's notes on the idea of the indispensability argument(s) for induction (as well as deduction). Finally, in section 5 I try to make an explicit statement of the indispensability argument for induction, whose variants may be elaborated as well.

2. Hume's problem of induction and its reconstructions

Nowadays, to talk about Hume's problem of induction may seem to be a bit imprecise. First of all, Hume uses the term "induction" neither in his *Treatise* (see Hume 1960), nor in his *Enquiries* (see Hume 1977). Moreover, he does not say anything explicitly about *induction* in his opuses. However, it is hasty to conclude from such a lack of verbal evidence that Hume's considerations and arguments are not about induction. In fact, it is now a philosophical truism that Hume's analysis of our causal talk and thinking (see, especially, Hume 1960, B I, Part III, sect. vi; and Hume 1977, sect. iv) and that of the principles guiding our causal considerations is, indeed, about inductive principles; and that the reasoning about causality is today reconstructed as a kind of inductive reasoning.¹

If inductive reasoning is, broadly speaking, any reasoning from the observed (or empirically verified) to the unobserved (or empirically non-verified), then the relevant parts of Hume's *Treatise* and *Enquiries* are standardly interpreted as arguments

¹ It is especially Hume's considerations of the transition from impressions to the ideas of objects where he formulates what is now recognized as the principle of the uniformity of nature: "...that instances, of which we have had no experience, resemble those of which we have had experience, and that the course of nature continues always uniformly the same" (Hume 1960, 89).

showing that we are not justified in our opinions about unobserved instances of anything that we have observed before (cf., e.g., Lange 2011, 45).²

To bring out an example, let us assume that every cell we have so far examined (microscopically) had contained ribosomes. However, if Hume's argumentation is logically valid, and moreover, if all of its assumptions are true, then we are not justified in believing that any cell—either examined or not—has ribosomes in its structure. That is, we are never justified to infer from

“All examined (observed) cells have ribosomes.”

to

“All cells have ribosomes.”

Seemingly, we often use such a kind of reasoning in various situations and with different cognitive, pragmatic, or other aims. The problem is not in believing generalizations that overcome what we have observed. The problem is in being (un)justified in such believing. If we acknowledge that, at least for a certain set of beliefs, there is a difference between knowledge and belief—the former has to be founded on certain evidence or justification, while the later doesn't—then Hume's problem is relevant for all those contexts in which we make generalizations about our knowledge of the unobserved (not just mere belief).³

To show explicitly the relevant points of Hume's argument against induction, I will rely on some of the reconstructions (differing slightly in vocabulary) and the elaboration of Hume's assumptions. Prior to this, a brief terminological preliminary should prove useful.

Hume opens Section iv, Part I of his *Enquiries* by distinguishing two kinds of reasoning:

All reasoning may be divided into two kinds, namely demonstrative reasoning, or that concerning relations of ideas, and moral reasoning, or that concerning matter of fact and existence (Hume 1977, 22)

What he calls “demonstrative reasoning” or “that concerning relations of ideas” is what we now

call “deductively valid reasoning,” or simply “deductive reasoning”; while the archaic term “moral reasoning” or “reasoning concerning matter of fact and existence” may be substituted with the modern equivalent of “non-deductive reasoning” or “induction.”⁴

After identifying reasoning concerning relations of ideas with deductive reasoning and reasoning concerning matters of fact with inductive reasoning, we can add certain basic qualifications to these two categories of arguments. First of all, given the definition of logical validity, it is impossible for a deductively valid argument to have a false conclusion if all of its premises are true. To admit that would be a contradiction. In other words, deductively valid arguments are *necessarily truth-preserving*. However, there is nothing contradictory in drawing a false conclusion from an inductive argument, even when its premises are true. Thus, inductive arguments are not necessarily truth-preserving. Moreover, an argument may be either deductively valid or deductively invalid; there are no degrees in between. On the other hand, we may admit that there are different inductive arguments, some appearing to be better than others; so it seems that the reliability, or plausibility, or “strength” of inductive arguments is a matter of degree.

There are also other semantic and epistemic features that distinguish deduction from induction. One of the most prominent is this: It is evident that the information contained in the conclusion of a deductive argument is at most that which is contained in its premises. There is no expansion of information in conclusions of deductively valid arguments. The opposite is true of inductive arguments' conclusions. The information expressed by such arguments' conclusions is not contained in their premises. For this reason, inductive arguments are held to be ampliative, while deductive arguments are non-ampliative.

Now, having this short list of main logical-semantic-epistemic differences in mind, let us formulate a preliminary version of Hume's question:

“Are we justified in going beyond our observations?”

Yet, as Salmon (1967) and Lange (2011, 47) note, this is too broad a question. In fact, we are, in com-

² However, Weintraub (1995) notes that contrary to the received view, it was Sextus Empiricus who originally presented an argument against induction in the form of a dilemma.

³ Salmon expresses that point for the context of scientific knowledge: “To say that certain methods yield knowledge of the unobserved is to make a cognitive claim for them. Hume called into question the justification of such cognitive claims” (Salmon 1967, 6).

⁴ To put non-deductive reasoning as an equivalent of induction requires a very broad conception of inductive reasoning, including analogical reasoning, abduction, and other logically invalid forms as well. For the sake of simplicity I will treat induction as such a broad family of inferences.

pany with Hume, interested in a more specific question, namely:

‘Are we justified in inductively inferring from the observed to the unobserved?’

And as we know, Hume’s answer is: No! To see why, we have to come back to the main points of Hume’s argument. In what follows I will make use of several slightly different reconstructions of that argument found in literature. Nevertheless, all of the selected reconstructions work with (at least) these two assumptions:

1. Any conclusion of an argument may be justified either inductively or deductively.

2. There is neither inductive, nor deductive justification of an inductive argument’s conclusion.

And they reconstruct the conclusion as:

3. There is no justification of any conclusion of inductive arguments.

To elaborate this argument, let me first introduce one of Salmon’s formulations of Hume’s argument:

Consider, then, any ampliative inference whatever. ... We cannot show *deductively* that this inference will have a true conclusion given true premises. If we could, we would have proved that the conclusion must be true if the premises are. That would make it necessarily truth-preserving, hence, demonstrative. This, in turn, would mean that it was nonampliative, contrary to our hypothesis. Thus if an ampliative inference could be justified deductively it would not be ampliative. It follows that ampliative inference cannot be justified deductively.

At the same time, we cannot justify any sort of ampliative inference *inductively*. To do so would require the use of some sort of nondemonstrative inference. But the question at issue is the justification of nondemonstrative inference, so the procedure would be question-begging. (Salmon 1967, 11)

It seems that the first—deductive—part of Hume’s argument “clothed” in Salmon’s reconstruction may be simplified and transformed into the following steps:

1. Ampliative inference = not necessarily truth-preserving inference = non-deductive inference.

2. Non-ampliative inference = necessarily truth-preserving inference = deductive inference.

3. To show/justify *deductively* that an ampliative inference has a true conclusion given true premises amounts to showing/justifying that the inference is necessarily truth-preserving and hence non-ampliative, which contradicts 1 and 2.

Hence:

4. There is no deductive justification of induction.

Premises 1 and 2 may be seen as definitions of fundamental relations between certain properties of inductive and deductive arguments, respectively.⁵

The second—inductive—part of Salmon’s reconstruction then comes in these points:

1. To justify an ampliative inference *inductively* requires the use of a non-demonstrative argument, i.e. an ampliative argument.

2. To justify an ampliative argument requires a non-circular justification.

3. To justify an ampliative argument by another ampliative argument would be circular.

Hence:

4. There is no inductive justification of induction.

Certainly, those two arguments of Salmon’s reconstruction do not, by themselves, demonstrate that there is no justification of induction. To do that, it is necessary to add one more premise:

“An argument’s conclusion may be justified either deductively or inductively (*Tertium non datur*).”

Given these two partial arguments and the additional premise, we can now conclude that there is no justification for induction.

That is, in brief, Salmon’s reconstruction of Hume’s argument against the possibility of justifying inductions.

In (Jacquette 2011, 3), we find a slightly different version of Hume’s argument. It is presented as a synthesis of two “subarguments,” where A) repre-

⁵ However, Lange in (2011) quotes those parts of Hume’s *Treatise* and *Enquiry* in which Hume offers reasons for accepting (some of) these definitory properties; see, e.g., (Lange 2011, 49–50). Moreover, Lange reconstructs the “deductive part” of Hume’s argument using the concept of *contradiction* as follows: If the conclusion of an inductive argument could be deduced from its premises, then the falsehood of the conclusion would contradict the truth of the premises. But the falsehood of its conclusion does not contradict the truth of its premises. So, the conclusion of an inductive argument cannot be deduced from its premises; cf. (Lange 2011, 48–49).

sents the deductive part, B) the inductive part and C) the conclusion:

- A) Induction cannot be validly justified. Purely deductive forms of reasoning are not sufficiently contentful to validly support the inference of any logically contingent proposition concerning a future occurrence, or generalizations from a sample of a population to all its constituents. Furthermore, deductive reasoning involves only logical truths, so any attempt to deductively infer logically contingent probabilistic truths is bound to be deductively invalid.
- B) Nor can induction be inductively justified, since that would be viciously circular.
-
- C) If induction can only be justified deductively or inductively, then induction cannot be justified.

There are various differences between this and the former reconstruction. Here, A) itself represents an argument whose first sentence expresses the conclusion that there is no *deductive* justification of induction. The two premises which come after the conclusion appeal to the concepts of *logical truths*, *logically contingent propositions*, and their *content*. The content of logical truths is empirically empty; it says nothing about the world. On the other hand, the content of logically contingent propositions has an empirical content—it says that there is certain state of affairs. Now consider any inductive argument with premises $P_1, \dots, P_n$ and conclusion U such that they all are empirically contentful; hence, logically contingent. To add any other proposition Q to the premises such that Q is a logical truth says nothing particularly about $P_1, \dots, P_n, U$, or their inductive relation. So, according to this line of reasoning, there is no deductive justification of induction.

What about B)? Here, B) may be supposed to be an elliptical argument saying that if there were a circular argument, it would be no justification; but to justify induction inductively is an instance of circular argument; therefore, there is no inductive justification of induction.

Finally, the conclusion comes in a form of a conditional: given that induction can only be justified deductively or inductively, it cannot be justified. And using the Deduction theorem, we can see that this argument is equivalent to another argument whose premises, besides A) and B), contain the antecedent of the original conclusion U , while the con-

clusion of this new argument has only the consequent of U .

It is quite obvious that Salmon's and Jacquette's reconstructions differ in several respects, both formal and semantic. However, they both are, in a sense, sketchy.⁶ They omit certain parts of Hume's assumptions, namely the appeal to the principle of the uniformity of nature, which serves as one of the steps in deriving his (general) conclusion about the unjustifiability of induction.

That's the reason why I finally turn to Samir Okasha's reconstruction from his (2001) paper. He offers a more fine-grained analysis of Hume's argument. It goes as follows (cf. Okasha 2001, 312):

1. Arguments from past experience, or "probable arguments," "proceed upon the supposition" that nature is uniform.
2. Unless we have reason to believe that nature really is uniform, we have no reason to believe the conclusions of arguments from past experience.
3. The proposition "Nature is uniform" cannot be established by demonstrative argument, as its negation is not self-contradictory.
4. The proposition "Nature is uniform" cannot be established by probable argument, as we only have reason to believe the conclusions of probable arguments if we already have reason to believe that nature is uniform, as (2) says.
5. If a proposition cannot be established by either demonstrative or probable argument, then we have no reason to believe it.
6. So we have no reason to believe that nature is uniform [from (3)-(5)].
7. So we have no reason to believe that the conclusions of probable arguments [from (6) and (2)], i.e. past experience gives us no reason to believe anything about the future.

It is this argument which adduces inductive skepticism. It explicitly mentions one of the crucial assumptions of Hume's argument (here premise 1) according to which our inductive practices (reasoning, arguments) rely (at least, implicitly) on an additional premise, to wit, that examined (observed, experienced) instances resemble unexamined ones. Moreover, as Okasha makes explicit, for Hume to be justified in believing the conclusions of inductive arguments implies that he is justified in believing the principle of the uniformity of nature (see premise 2). The rest of Okasha's reconstruction is similar to that

⁶ Of course, this is due to the reasonable goals that these authors had in mind.

of Salmon and Jacquette, even though the target conclusion of the inductive argument in Okasha's case is the specific principle of the uniformity of nature.

It is evident that Hume's argument reconstructed in this way is logically valid. The question whether it is also sound, that is, if all of its premises are true.

3. Attempts to solve it

Of course, there have been made different attempts to solve Hume's problem of induction. Some of them try to undermine the truth of (some of) its premises; others choose different strategies. In this section I briefly discuss some of the prominent replies to Hume's problem.⁷ All in all, they seem to me unsuccessful, with the possible exception of Okasha's approach. However, my strategy to cope with Hume's problem comes along with the help of Jacquette (2011), as will be shown in section 4 and 5. In what follows, I briefly look at Karl Popper's proposal of deductivism as an adequate solution to Hume's challenge; then I continue with Max Black's defense of the legitimacy of certain circular arguments. Next I examine John Norton's Material theory of induction. Finally, the last word in this section belongs to Okasha's critique of Hume's argument.

Popper's deductivism

If we simplify Popper's stance to the problem of induction, we can say that according to deductivism, we can never justify or confirm (unrestricted) general hypotheses by (finite amount of) observation sentences. But it is in fact no real aim of science to inductively confirm hypotheses. Induction plays no role in science. Instead, falsification is the method distinctive of scientific endeavour, because it is the only method by which we can discover our errors, and thus the only method which can bring us closer to truth (cf. Popper 1959; or 1972, chap. 1).

Although my aim here is not to cope in detail with Popper's arguments, I hope two comments will be sufficient to show that this is not the proper way of replying to Hume.

First, Popper's 'solution' is restricted to the domain of scientific knowledge. But what about the

context of common-sense knowledge? Should the solution really be restricted only to attempts at falsification of general hypotheses? It seems to be obvious that our common-sense inferential practices are not restricted to testing only general 'hypotheses' by falsification alone. So what about the implications of Hume's argument for non-scientific contexts of knowledge? If we, on the other hand, normatively require limiting our common-sense knowledge to falsifiable but not yet falsified belief, it poses another problem—that of justifying why we should proceed that way.

Second, even if we narrow our considerations to only a scientific context, it is possible to read Popper's claims in two distinct ways: one descriptive, the other normative. If we adhere to the descriptive reading—saying that we use no induction in science—it is obviously a false statement. On the normative interpretation, there are serious problems which various authors made explicit (see, e.g., Salmon 1981; or Newton-Smith 1981). Anyway, to propose deductivism as the only way (or, less radically, as the best way) of coming closer to the truth of scientific theories seems to inductively presuppose that what we conceive of as rational grounds for adopting deductivism today is not going to change (at least) tomorrow; that is, the very argument for a normative proposal of adopting deductivism as the only (best) strategy of science presupposes that our ability to understand the reasons for that argument will not change.

Black's inductive defence

Max Black in his *Problems of Analysis* (see Black 1954: chap. XI) provides a strategy of how to justify induction inductively. He is fully aware of the charge of circularity characteristic of the inductive justification of induction. However, he distinguishes two possible kinds of circularity, which Salmon (1967) dubs i) premise-circularity; and ii) rule-circularity, respectively. The first kind of circularity is a classical *petitio principii*. It amounts to an argument whose conclusion is just one of its premises. Now, imagine the following rule R1:

R1: To argue from "All examined instances of A's have been B" to "All A's are B."

And consider this argument:

P: All examined instances of the use of R1 in arguments with true premises have been instances in which R1 has been successful.

Hence

⁷ In what follows I owe much to Salmon's (1967) and Lange's (2011) analysis of various philosophical projects coping with Hume's problem. An informal summary of some of them can be found, e.g., in (Ladyman 2002). On the other hand, (Lipton 2004, chap. 1) provides a nice description of various inductive practices.

C: All instances of the use of R1 in arguments with true premises are instances in which R1 is successful.

Black (1954, 198–199) notes that the conclusion of the argument says that the rule R1 is always successful if applied to arguments with true premises, while the premise says that R1 has always been successful so far examined. And while P is entailed by C, C is not entailed by P; so the conclusion of the argument is not a premise-duplication, and hence, not an instance of premise-circularity. If this is the case, then it seems that there are certain arguments which are self-supporting despite their circularity.

Unfortunately, as Salmon (1967, 14–17) showed, there is an easy way to construct similar self-supporting arguments for so-called counter-inductive rules, such as:

RC: To argue from “All examined instances of A’s have not been B” to “The next instance of A will be B.”

Thus, it seems that attempts to justify induction inductively, even after accepting the differences between the premise- and rule-circularity, do not lead to the intended outcome.

Norton’s local inductions

John Norton in his recent (2003, 2010) articles elucidates fundamental aspects of the theory of induction which seem to differ from the traditional view on induction. He argues that if the traditional assumption that induction is governed by universal rules is discarded, then the problem of induction is dissolved. The positive account of our inductive practices, which he calls “A Material theory of induction,” is aimed at explaining how induction may be warranted.

Norton claims:

In a material theory, inductive inferences are warranted by facts. ... We can infer inductively from the evidence that some samples of the element Bismuth melt at 271°C to the universal conclusion that all samples melt so. The warrant is a fact about chemical elements: *Generally*, all samples of one element agree in such physical properties. (Norton 2010, 3)

The general assertion that Norton appeals to is for him both the factual statement and the warrant for the conclusion that every instance of Bismuth melt at 271°C. But how do we come to the conclusion that all samples of one element agree in such physical properties? Norton’s answer is straightforward:

We now know that elements are constituted of large numbers of atoms, all of the same type laid out in the same way microscopically, so that all samples of the same element are microscopically identical, mostly, and so have the same physical properties. In turn we know these facts from investigations in chemistry that have identified which substances are the chemical elements; and from investigations from physics that have mapped out the atomic structure of each element. (Norton 2010, 7)

So it seems that there is a net (or hierarchy) of ‘local’ inductive inferences in which the conclusions of some inductions provide the warranting facts—that is, premises—for other inductions. Indeed, it is the picture of scientific inferences that Norton assumes:

Since each fact draws on many others for inductive support, the compass will grow exponentially and could quite possibly embrace all of science. Is that the revealing of a fatal circularity in the inductive grounding of science? Or is it, as I am inclined to believe, merely a manifestation of the inductive solidity of all science? As long as we consider mature science, we cannot tinker with one part without triggering a collapse everywhere. (Norton 2010, 7)

Norton realizes that there is a charge of regress in such a conception, but he nevertheless holds that it is a kind of speculation, and that only discovering such a speculation to be the truth would constitute a problem.

However, it seems to me that, even leaving any other considerations aside, Norton’s approach just misses the point. First, Hume’s arguments do not show that we are mistaken in believing inductions, but only that we have no justification that we are right in our inductive practices. Norton’s argumentation does not help to escape that conclusion.

Second, Hume’s arguments do not aim at showing that some general theory of induction with some presupposed universal inductive rules determines justification. For even if we accept Norton’s picture of the network of inductively inferred facts, we have to show that we are justified in at least one inductive inference without invoking another inductively inferred fact, as Kelly (2010) notes. Going beyond observations is precisely what an inductive skeptic takes as doubtful (cf. Kelly 2010, 763). And it seems that Norton didn’t show that we are justified in doing so, nor that we do not need such a justification.

Okasha on our inductive practices

As I said at the beginning of this section, Okasha's attempt to cope with Hume's argument seems to me promising, at least in a sense. Recall Okasha's reconstruction of Hume's argument from section 2. The argument presented there is valid, but the question is whether it is sound. Okasha's strategy consists in questioning premises 1 and 2. Consider the premises, once again:

1. Arguments from past experience, or "probable arguments," "proceed upon the supposition" that nature is uniform.
2. Unless we have reason to believe that nature really is uniform, we have no reason to believe the conclusions of arguments from past experience.

Okasha says that both of the premises are false. He says:

The argument rests on his flawed description of our inductive behaviour. The inductive principle which he says we employ is one which we most certainly do not employ, as Goodman showed. We believe that some observed regularities will continue into the future, but not others. The first two premises of Hume's argument are therefore false. Hume has not found any inductive rule which we use to extrapolate past data into the future, and so he has not found any empirical assumption about the world on which the reasonableness of our arguments from experience is conditional. (Okasha 2001, 314)

If we grant Okasha's claim that Hume's description of our inductive behaviour is false—that is, that we are not relying on the (general) principle of the uniformity of nature—then we are also inclined to accept Okasha's conclusion that "if we do *not* in fact arrive at our opinions by using inductive rules, then Hume's sceptical argument cannot be converted into a sound one" (Okasha 2001, 315).

But this seems to be a somewhat strange conclusion. Why? Let me put it briefly in two points. First, to doubt some specific inductive principle—such as the principle of the uniformity of nature—or to doubt that our inductive practices are based on such a principle is not equivalent to concluding that we use or presuppose no inductive principles in our inferences. It is one thing to show that Hume's description of our inferential practices is flawed, and another thing to show that there is no inductive prin-

ciple at all that we tacitly use in our inferences. Thus we can accept Okasha's point that Hume's argument *is not* sound, but still, *it does not mean* that it *cannot* be converted into a sound one were another inductive principle to be found. To show that would require a separate argument.

Second, even if we accept Okasha's generalized conclusion that there is no use of inductive rules for gaining our opinions about the unobserved, then another troublesome question arises: How can we gain such opinions? As we've seen so far, there is no way a logical truth could do the job. Where are we left? Is it all just guesswork, or something else? Be that as it may, Okasha's paper does not help us with answering those questions.

Let me conclude this section with a short summary. First, Popper's attempt fully accepted Hume's points, but he did not accept Hume's skepticism. As we saw, Popper's strategy was to absolutely dispense with induction. Second, Black's attempt was to show that there are cases of circularity which seem to be reasonable to accept. However, this strategy is bound to cope with similar counter-inductive cases. Third, Norton's material theory relies on the existence of domain-specific general facts. However, this picture requires that, at least for some inductions, we are warranted in our general conclusions without invoking other general conclusions from other inductions. Finally, Okasha's doubts about the correctness of the principle of uniformity of nature are plausible. So we could accept that Hume's argument as it stands in Okasha's reconstruction is not sound due to the falsity of the first two premises. But it does not follow that Hume's argument cannot be transformed into a sound one if we find a correct description of our inductive practices.

However, there seems to be another way of criticizing Hume's argument. We can turn to it now.

4. Dale Jacquette on how (not) to justify induction

In his (2011) paper, Dale Jacquette draws our attention to the fact that "[t]he standard problem of induction presupposes that induction needs to be justified in ways that deduction does not, and that induction in one way or another falls short of the mark" (Jacquette 2011, 4). It is deduction that has the high epistemic virtues of becoming a golden standard for our inferences. However, as he shows, the argument against the justifiability of induction (from section 2) may be easily transformed into an

argument against the justifiability of deduction. Consider the following argument:

1. Deduction cannot be inductively justified. Induction offers only probably true conclusions that are not strong enough to uphold the necessity of deductively valid inferences.
2. Nor can deduction be deductively justified—that would be viciously circular.
-
3. If deduction could only be justified deductively or inductively, then deduction cannot be justified.

Here the ‘logic of reasoning’ is similar to that of the Hume’s argument (at first sight, at least). Setting aside possible objections against this analogy, the main point here is to see that there is something unsatisfactory in thinking about the justification in this way, both for induction and deduction. Although Jacquette does not claim this explicitly, we can say, based on what he says, that he rejects the premise that induction (or deduction) can only be justified deductively or inductively—which is the antecedent of the conclusion for both of his arguments. So he points to the fact that there may be another kind of justification, which is offered by an indispensability argument. Jacquette refers here to Aristotle’s advice: “Where we cannot derive, we may need to presuppose.” But the question is which presuppositions to accept. It is not the case that any presupposition we rely on in our reasoning is justified. And again, Jacquette sees Kant’s advice as promising: “The method is to identify those principles whose truth we cannot even question without presupposing that they are true.” That is, if we want to justify deduction, we have to find those fundamental principles which are presupposed by their very questioning.

Jacquette invites us to imagine a similar way of reasoning in case of induction. The question whether we could find an inductive principle which is presupposed even in the questioning of induction. Jacquette, in the final part of his paper, provides a very interesting description of an inductive criticism which seems to presuppose some inductive principle. Let me quote the whole section of his description:

Looking more carefully at the situation we are imagining with respect to a future turn of events in which the uniformity of nature breaks down disappointing our inductive inferences made up to that point nevertheless appears to presuppose inductive reasoning.

For in that case we are in effect thinking of our use of inductive methods as hypothetical, and projecting a counterinstance to the truth of the conclusion of an inductive inference. Thus, we could at that point say, if the breakdown of the uniformity of nature is something we as thinkers could physically survive, that our inductive methods have worked fine up to time *t*, and now can no longer be relied upon. If that is the conceivable or otherwise logically possible situation that philosophers trying to cast doubt on induction’s semantic and epistemic credentials need to project in considering whether or not induction is justified, then they are themselves applying inductive methods involving failed implications of a hypothesis in order to raise skepticism about the justification of induction. (Jacquette 2011, 10)

I take the idea of the indispensability principle (argument) to be on the right track. However, I will elaborate Jacquette’s notes into an explicit argument which differs slightly, in certain ways, from the reasoning of the above quoted text. This is the task of the final section.

5. Indispensability Argument(s)

First, let me put the content of my argument in an informal way. Suppose that we think about some particular inference from “All observed A’s have been B” to “All A’s are B,” that is, we consider an instance of an inductive inference. Moreover, suppose that we hold that inference as plausible until some time *T*, after which we discover an instance of A which is not B. In such a case we would say that we discovered that this particular inductive inference was incorrect. And, unsurprisingly, we also find that this inference is incorrect after *T* (i.e. now, in the present time). But is it possible to think about the fallibility of induction without presupposing that certain other things have been unchanged? To be more specific: Isn’t it the case that in discovering that the inductive generalization “All A’s are B” is incorrect, it must be the case that at least some of our cognitive capacities—those which are necessary for the identification (and awareness) of “All observed A’s have been B” before *T* and “An instance of A is not B” after *T*—have not changed? Would we be able to discover that an inductively inferred generalization does not hold if, in the moment of finding some counterinstance, we lost memory, or we strongly fell into the belief that so far no instances of A have been B? It seems to me that it would be

impossible for us to determine that the given inductively inferred conclusion does not hold if our cognitive capacities changed so dramatically.

So, if our reasoning so far is correct, it looks as if the very thinking about the failed induction presupposes that our cognitive capacities necessary for its identification haven't changed. And that seems to be an instance of an inductive principle (IP): If, today, anyone is able to recognize whether "So far all examined A's have been B" is a true or a false statement, then she will be able to recognize whether "So far all examined A's have been B" is a true or a false statement tomorrow, as well (and the day after tomorrow, etc.). Without presupposing such a kind of principle it is hard to imagine that anyone could plausibly think about the identification of a failed induction.

Let me put the main ideas from the previous section into an argument:

1. If there is some (future) situation such that, before some future time T, we believe that "All A's are B" because "So far all examined A's have been B," but after time T, we cease to believe that "All A's are B" because we discover an instance of A that is not B, then such a situation presupposes that our cognitive abilities which are necessary for identifying the change have not changed.
2. To presuppose that certain cognitive abilities—those necessary for the identification of a change (in the truth status of an inductive generalization)—do not change, amounts to relying on the inductive principle (IP), or a version of it.

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3. If there is some (future) situation such that, before some future time T, we believe that "All A's are B" because "So far all examined A's have been B," but after time T, we cease to believe that "All A's are B" because we discover an instance of A that is not B, it amounts to relying on the inductive principle (IP), or a version of it.

Now, even though the conclusion of the argument is in a conditional form, it suffices to imagine that there is, in fact, such a situation in which we are able to recognize that a certain observed (examined) regularity ceased to hold. If this is the case, then a kind of inductive principle lies in the very thinking about a possible (as well as existing) failure of induction. And, hence, certain inductive principles are

indispensable even in questioning the reliability of (specific) inductions.

If anyone wishes to elaborate further on the details of those cognitive abilities which are necessary for our identification of failed inductions, there is a room for it. There can be other alternative instances of the indispensability argument for induction. The point here was simply to sketch an inductive principle which seems to be necessary in fictional as well as real questioning of induction.

Let me conclude with a word of caution: I have tried to show that by adopting Jacquette's ideas, we can avoid Hume's skeptical conclusion by rejecting the premise that induction can only be justified inductively or deductively, and that we can proceed positively by finding some argument(s) showing that certain inductive principles are indispensable even when thinking about the unreliability of induction. This is, however, in no way an argument showing that some particular (forms of) inductive arguments—such as statistical generalization, or analogy, or inference to the best explanation—are justified.

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RATIONALITY AS A SYSTEM IN THE CARTESIAN BEGINNINGS OF MODERN PHILOSOPHY, STARTING FROM SOME HEIDEGGERIAN IDEAS*

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Abstract:

The aim of this article is to offer a contribution to our understanding of the way in which reason appropriated the idea of system at the beginning of the modernity and made from it one of its emblematic forms of expression. I will start with seminal remarks on the topic from Martin Heidegger, and will then move to the idea of the system in the works of René Descartes, the pathfinder of modern philosophy. After commenting on some Cartesian ideas, I will outline six points of support for and development of Heidegger's conception about the system of philosophy and its roots in modern science.

Key words: system, modernity, Descartes, Heidegger, principle, method.

In what follows, I will start from the general semantic remark that in modern philosophy, the concept of "system" is most often understood first in the narrow (and more technical) sense as a "system of philosophy"—an understanding which can be traced back to Descartes, who began the period of

what would be called "the era of the great philosophical systems," especially the systems of the German Idealists. We could also understand the word "system" in the much broader sense of a "system of knowledge" (or "knowledge as system"), which signifies, generally speaking, a new positioning for humanity in relation to reality. Of course, this latter sense also presupposes a new understanding of humanity's being itself, i.e. the affirmation of what we call modern subjectivity.¹

In other words, we assume that the concept of "system" implies two different (but related) aspects: a) a "system of knowledge" or a "cognitive system," i.e. a system understood not by the intelligibility (or the principle of organization, of determining and structuring the being as such) of some entity (a concrete being, a functional part of it, a certain sphere or area—as in the digestive system or the solar system, etc.), but as an activity and its effects on the structuring or ordering of the knowledge itself; b) as referring strictly to the concept of a "system of philosophy" that presupposes the "technical" configuration of philosophy as a whole (but not the actual realization or fulfillment of this "task of thought") according to the previous sense—the result thus taking into account the human mind's ordering possibilities through philosophical

* Certain parts of this text appeared previously in two other published essays: *Proiecte filosofice ale Modernității* (Philosophical Projects of Modernity), vol. I, University of Bucharest Publishing House, 2008, and "Le système philosophique à l'aube de la Modernité—le cas Descartes" ("The Philosophical System at the Dawn of Modernity"—Descartes' Case"), in M. Pop, S. Totu, V. Vizureanu (eds.), *Les Actes du Colloque International "Systèmes, Images, Langages,"* Bucarest, 14 et 15 juin 2006, University of Bucharest Publishing House, 2008, pp. 243–256.

¹ I will not attempt to offer here an *in extenso* justification of this distinction (outside the brief remarks that follow), nor will I more deeply investigate the possible relationships and tensions between the two senses mentioned above. I leave these matters to other studies.

categories at the expense of a systematic structure of reality itself, of being as such.

Understood this way, the system of the moderns implies some peculiar features that differentiate it from previous configurations in the history of thought: the human mind's activism in linking different pieces of knowledge; the human mind's ideal of totalizing and unifying, an ideal expressed by modern science; the characterization of the entities of knowledge to which our mind refers as being "ideas" which are best-suited to our minds themselves—and only then as having an ontological referent in the real sense of the word.

Another perspective—one with a much more consistent theoretical framework—can be seen in Martin Heidegger's penetrating (although relatively briefly expressed) thoughts on this topic. I will try to develop and complete these thoughts with my own remarks. The Heideggerian considerations I am referring to can be found in the sections "What is a System and How Does Philosophy Come to Build Systems?" and "Sketch of Modern Projects for a System (Spinoza, Kant's Will to a System, Kant's Significance for German Idealism)," from his *Schelling's Treatise on the Essence of Human Freedom* (*Schellings Abhandlung über das Wesen der menschlichen Freiheit*).²

Heidegger shows that, surprisingly, the philosophical system does not appear either in Antiquity (e.g. in Plato or Aristotle, though we can find in their works germs of this future philosophical tendency), or in the Middle Ages (Heidegger argues that not even Thomas Aquinas's monumental and complex *Summa theologiae* can be considered as such). This is because "a system is not only (and not primarily) an order of completed material of knowledge and values of knowledge for the purpose of correct communication of knowledge, but system is the inner jointure of what is comprehensible itself, its founding development and ordering. Even more, system is the conscious joining of the jointure and coherence of Being itself" (Heidegger 1985, 28).

Moreover, "[i]f system thus has nothing of the externality and haphazardness of the artificial order of a classification of material under headings and

numbers, then the formation of systems stands under quite definite conditions and cannot come about historically at an arbitrary time." (Heidegger 1985, 28). The system as such is thus not an unhistorical or trans-historical method/feature of human knowledge or human thinking.

Put briefly, for Heidegger the system is not a simple external form of ordering knowledge, but a (historical) decision about the being of things, a decision about the way we think about being as such. In the Cartesian approach we find some features of a new and specific way of conceiving being, an approach that opens the way for modern philosophy to be understood as a system. A decisive point here would be the more or less "imposed" and more or less "conscious" dialogue of metaphysics with science, or more exactly, with the modern scientific spirit.

As Gadamer also emphasizes, "for all of two centuries right down to the death of Hegel and Schelling, it was actually constructed in such a self-defense against the sciences. The systematic edifices of the last two centuries are a dense succession of such efforts to reconcile the heritage of metaphysics with the spirit of modern science." (Gadamer 1998, 6).

The features highlighted by Heidegger on this topic, and thus the guiding premises of my own research, are the following:

- 1) *The predominance of the mathematical* in the development of the goals of knowledge and in the foundation of its forms—"the unity of a foundational context of principles supported by first principles and ordered in accordance with them is required for the totality of knowledge." (Heidegger 1985, 30);
- 2) The self-foundation of the knowledge according to this exigency: certainty has to acquire *precedence* over the truth—"what is important *above* all is that, in general, something is immediately and unshakably knowable at all times and *only then* is it of *secondary* importance *what* that is in content that is known" (Heidegger 1985, 30);
- 3) The foundation of certainty as the self-certainty of *ego cogito*, of "I think." In other words, "*ego cogito* is posited as what is first of all and truly knowable and thus

² For citations of Heidegger, I will use the following English edition: Martin Heidegger, *Schelling's Treatise on the Essence of Human Freedom*, Translated by Joan Stambaugh, Ohio University Press, Athens, Ohio / London, 1985.

true” (Heidegger 1985, 30). *Ego cogito* becomes the real and unique model for truth;

- 4) *The self-certainty* of thinking fundamentally decides what “is.” What is certain is true and “only what is true can be acknowledged as truly *existent*” (Heidegger 1985, 30). Certainty becomes the criterion of being;
- 5) The shattering of the dominance of church faith and dogmas in shaping knowledge. The situation is now reversed: “the truth of faith and faithful knowledge are now measured in terms of the self-certainty of pure thinking with regard to its correctness” (Heidegger 1985, 31);
- 6) As a direct consequence of the above point, “[t]he setting free of man for the creative conquest and rule and new formation of beings in all areas of human existence” (Heidegger 1985, 34) took place.³

³ It should be remarked that it is possible to draw a similar conclusion by following the lines of a totally different hermeneutic perspective than the one circumscribed by the actual history of philosophy (in a broader sense). This is shown in the observations of Amos Funkenstein, a well-known historian of culture and of ideas. For him, “[w]ithin the Aristotelian and Scholastic tradition, it was forbidden to transplant methods and models from one area of knowledge to another, because it would lead to a category-mistake. This injunction suited the social reality of medieval universities well, separating theology from philosophy to the benefit of both; but it eroded considerably from the fourteenth century, when mathematical consideration started to be heavily introduced into physics, and even into ethics and theology. What was a methodological sin to Aristotle became a recommended virtue in the seventeenth century. Since then we have been urged to transport models from mathematics to physics and from physics to psychology or social theory. The ideal of a system of our entire knowledge founded on one method was born. Aristotle never entertained it; neither did Scholasticism. Indeed, the very word ‘system’ stood, until the seventeenth century, not for a set of interdependent propositions but for a set of *things*—for example, *systema mundi* or *systema corporis*. The ideal of one, unified system of knowledge could hardly exclude theological matters, down to Spinoza’s treatment of God *more geometrico*” (Funkenstein 1986, 6). The first lines of the passage are well-supported by a crucial fragment drawn from the very beginning of Descartes’ *Rules for the Direction of the Mind*, in which he criticizes (without naming it) the previous cognitive model—that of Aristotle—announcing at the same time what we could now label a program of a new cognitive

As I mentioned at the beginning of this study, I will try to make some additions to the brief outline sketched by Heidegger, while attempting to stay within the “spirit” of the Heideggerian text. In doing this point by point, I do not aim to follow or to reach a certain inner logic of my own making.

First of all, we could stress the importance of a very famous Cartesian metaphor, that of “the tree of philosophy,” which appeared in *The Principles of Philosophy*. Here for Descartes “the whole of philosophy is like a tree. The roots are metaphysics, the trunk is physics, and the branches emerging from the trunk are all the other sciences, which may be reduced to three principal ones, namely medicine, mechanics and morals” (Descartes 1985, 186 / AT, XB, 14).

But of course, what is at stake is not only a metaphor, but a very concrete project of knowledge which Descartes attempted to fulfill throughout his philosophy. At the time of publication of the previously mentioned work, the metaphysics presented in the *Meditations* and the physics of *The Principles* already existed. Paradoxically, what was apparently the hardest thing to achieve—the discovery of unshakeable foundations of knowledge (*fundamentum inconcussum*)—had already been published.

However, as is well known, the Cartesian project remained unfinished. Besides his more or less extended and relevant contributions to medicine and mechanics, Descartes’ morals are far away from what he himself considered to be the real culmination of knowledge, “the ultimate level of wisdom” (Descartes 1985, 186 / AT, XB, 14).⁴ In a

positioning: “Distinguishing the sciences by the differences in their objects, they [the people, V.V.] think that each science should be studied separately, without regard to any of the others. But here they are surely mistaken. For the sciences as a whole are nothing other than human wisdom, which always remains one and the same, however different the subjects to which it is applied, it being no more altered by them than sunlight is by the variety of the things it shines on. Hence there is no need to impose any restrictions on our mental powers; for the knowledge of one truth does not, like skill in one art, hinder us from discovering another; on the contrary it helps us” (Descartes 1985, 9 / AT, X, 359–360).

⁴ Doing this in intention, but not, of course, in content, Descartes seems to follow important medieval thinkers who precede him. Identifying the origin of this idea in Thomas Aquinas, Cottingham gives as an example of this

letter to Princess Elizabeth, after being questioned about the possibility of the creation of definitive morals, Descartes referred only to the three rules of provisional morals, which are in essence the same as those mentioned in the *Discourse*. In other words, Cartesian morals seem to stagnate at the provisional stage proposed in what might be called the general outline of knowledge presented in the *Discourse*. *The Passions of the Soul* undoubtedly represents a step forward for linking morals to the psycho-physiological realm through its development of morals in accordance with the natural behavior of the human body. But, as Descartes himself recognized, there was too much unknown data in the human picture for him to be able to draw up an effective “science of morals.”

But—and this is a crucial point—this did not at all threaten the *system character* that we can assign to philosophical thinking, and even less the idea of system as a cognitive ideal asserted in the epoch (and not only by Descartes). For otherwise the only complete system would be Spinoza’s, in which it is, in fact, ethics—an ethics Descartes never reached—which permeates the realm of metaphysics and his research into instruments of knowledge, providing the title itself of the philosopher’s main work and the key to understanding his entire system.

In fact, we see here at work metaphysics *in view of* ethics, metaphysics *for* ethics. This recalls Descartes’ metaphor of knowledge, that “[n]ow just as it is not the roots or the trunk of a tree from which one gathers the fruit, but only the ends of the branches, so the principal benefit of philosophy depends on those parts of it which can only be learnt last of all” (Descartes 1985, 186 / AT, XB, 15).

But the visible “figure” or “form” of the system is not the same thing as aiming develop a philosophy which dialogues with or mirrors the sciences—this last is practically what counts in modern thinking as a Heideggerian hermeneutical framework. And Heidegger strongly emphasizes this, on the one hand

denouncing all the “un-authentic” achievements of the “systems creators” (simple “implementers” of mechanical divisions in the realm of knowledge), and on the other hand reminding us that the most impressive philosophical system in early modern times belongs—surprisingly to those who see only the concrete “form of writing”—to Leibniz: “gauged by the *inexhaustibility of its systematic power*, Leibniz’s philosophy towers far above all others” (Heidegger 1985, 34, emphasis mine).

Secondly, a central idea for the present topic is the one of *the unification of science*, certified by the existence of the concrete project of relating all sciences to a “science of sciences”—*mathesis universalis*. Of course, this project is not an entirely new one in the epoch; the Cartesian way of conceiving it is as a mirror of the role presently played by mathematics in knowledge.

We deal here with the question of what might be called the “unifying and essential character of modern science,” the way in which we can certify any given approach as a “science,” including those about which we are already certain, like arithmetic or geometry. Moreover, *mathesis universalis* enables us not only to “check” the existing sciences, but also to further the extension of knowledge by clearly demarcating the general ontological and epistemological framework of the scientific research.

As we have already seen, the essential outline of this project is drawn from the first lines of the *Rules*.⁵ The key words of this new mode of configuring (real) knowledge, i.e. of the system of knowledge, are the *unity*, *essential homogeneity*, and *concatenation* of the sciences. A proper exemplification for the last of these features could be also drawn out from the *Rules*; as Descartes stressed, “[i]t must be acknowledged that all the sciences are so closely interconnected that it is much easier to learn them all together than to separate one from the other. If, therefore, someone seriously wishes to investigate the truth of things, he ought not to select one science in particular, for they are all interconnected and interdependent.” (Descartes 1985, 10 / AT, X, 361).

Moreover, the above features could be brought together under the category of *continuity*. As Ortega

kind of systematic knowledge Eustachius e Sancto Paulo (studied by Descartes), and stresses that “Only such a holistic conception could serve the final end of a complete philosophical system, which Eustachius declared to be nothing less than ‘human felicity’” (Cottingham 2008, 6). “Despite his radically new approach to philosophy,” Cottingham adds, “Descartes was determined to show that his system was no less fertile than those of his predecessors from the moral and felicitic point of view” (Cottingham 2008, 231).

⁵ See note 4.

y Gasset observed, “the image of the chain appears many times in Descartes’ work. It expresses, with a great power, the relationship of an obvious connection between each group of two truths, the continuity of the whole series in deductive theory, and the methodological principle according to which the science consists in ordering our ideas so that we pass from one to another in an obvious manner” (Ortega y Gasset 1970, 262).

The possibility of a unified science is opened up by the presence of a kind of scientific “essence,” “inscribed” by the mind itself into each of the particular sciences. The (same) activity of the mind is the sole source of the truth. And even though the natural light of the mind is put in us by God, for Descartes this appears to be only a kind of formal attribution or function, because “technically” speaking we human beings are the effective judges of what is science and what is not from our position as autonomous and almighty “distributors” of evidence for each truth.

Besides, *mathesis universalis* is not just a famous dream of youth; even if this project remains unfinished, concrete steps are added by Descartes toward its realization. We refer here to one of his remarkable discoveries (at least in its essential elements), namely what is today called *analytic geometry*. If geometry can be “translated” into algebra, and if the algebraic equations can be in their turn visualized through lines and curves, then can we not imagine that this could be the case for all other sciences, that there could exist a hidden, “subterranean” scientificity behind the language of mathematics itself? Moreover, even they are lacunar or imperfect, are not the *Dioptrics* and the *Meteors* benchmarks toward its discovery?

As R. Lauth remarked, “the discovery of analytic geometry led Descartes to a *scientia penitus nova*. He could have stopped himself there, but the interest that prompted him towards knowledge of as a whole made him determined to examine whether mathematical knowledge could not serve, beyond itself, as the cognitive foundation for a new science,” i.e. *mathesis universalis*. “Philosophers from Pythagoras to Galileo,” adds Lauth, “had already reached this point. What is new here with Descartes, in an absolutely brilliant way that is his alone, is the fact that he goes beyond *mathesis universalis*. (...) Descartes returned from the outer world to the mental one and asked himself the question: could not a true (and systematic)

knowledge be possible here, too? And if the answer is ‘yes,’ how do we determine it? (...) Beginning with the *Regulae*, we see an enlargement of knowledge about the realm defined by cogitation and even God himself” (Lauth 2004, 242).

Thirdly, the system character of knowledge is displayed once again in *the idea of a single principle*, i.e. of a supreme principle as a unique point of departure for the whole of knowledge. In a 1646 letter addressed to Clerselier, Descartes indicates that “one should not require the first principle to be such that all other propositions can be reduced to it and proved by it. It is enough if it is useful for the discovery of many, and if there is no other proposition on which it depends, and none which is easier to discover. For it may be that there is no single principle at all to which all things can be reduced.” (Descartes 1991, 290 / AT, IV, 444–445).

Of course, this answer could have two distinct meanings: either—in a positive sense—that Descartes had reached the idea of a system of philosophical knowledge which starts from a single principle; or—in a negative sense—that he was still doubting the existence of such a supreme principle, or doubted the ability of the human mind to grasp it. But, even in the latter case, we should admit “that a system which starts from a single supreme principle did represent for him [for Descartes, V.V.] at least the *ideal* of a philosophical system” (Lauth, 2004, 20).

But even though this assertion is somewhat satisfactory,⁶ it could well be improved. Moreover, I would argue strongly that Descartes’ work is illuminating enough on this important point. Descartes stressed in the same letter to Clerselier that “the word ‘principle’ can be taken in several senses. It is one thing to look for a *common notion* so clear and so general that it can serve as a principle for proving the existence of all the beings, or entities, to be discovered later; and another thing to look for a *being* whose existence is known to us better than that of any other, so that it can serve as a *principle* for discovering them” (Descartes 1991, 290/AT, IV, 444–445). Descartes next gives as example of the first type of principle the sentence “It is impossible for the same thing both to be and not to be at the same time” (*impossibile est idem simul esse*

⁶ Due to the analysis we undertook above.

et non esse), and for the second type the sentence “Our souls exist”—of course, the second one is a philosophical formulation equivalent to the assertion of the *cogito*’s existence.

As R. Lauth comments, “as long as philosophy aims to know what *is*, then we understand that only a notion that includes concomitantly essence and existence could claim the title of supreme principle of an entire system” (Lauth 2004, 26). Or, in the case of the ego itself (this time following L. Brunschvicg), the relation between essence and existence is one of an immediate identity. In each of ours acts of thinking (even those in which we are deceived or are deceiving ourselves), we perceive, before any other thing, the fact that we are thinking—“the spirit thus perceives the essence of the thought, which consists in knowing himself, and in this essence itself, the existence, because it is impossible to know yourself without knowing that you exist” (Brunschvicg 1923, 247).

The crucial existential opening of the Cartesian problem of the first principle is quite manifest: you can reduce other propositions to the principle “It is impossible for the same thing both to be and not to be at the same time,” but this procedure is in fact “superfluous and useless.” “On the other hand,” adds Descartes, “it is very useful indeed to convince oneself first of *the existence of God*, and then of the existence of all creatures, *through the consideration of one’s own existence*” (Descartes 1991, 290 / AT, IV, 445).

In fact, the opposite sense of the two cognitive movements is clearly noted. In the first case we are dealing with a reduction—with a move from various propositions to that presumed unique principle—and doing so, moreover, without ensuring that the things being discussed in these propositions actually exist. In the second case we start from this first principle itself, and thus knowledge widens in an obviously existential way. We could add, in the same sense, that in the first case we are at a cognitive “endpoint” (by which we verify our knowledge), while in the second one we access a “starting point” (which enables the increasing of knowledge—we find here an expression of a logic of discovery).

The importance of the Cartesian approach from this perspective is much bigger, a real revolution in the way we think about systems, insofar as Descartes “overcomes the Euclidean concept of system by not seeking to ground the ideal of scientific knowledge in a system of knowledge that is itself grounded in a

plurality of assumptions (which cannot be further reduced or which are considered irreducible), but seeks instead to ground it on a system that starts from a single supreme principle” (Lauth 2004, 237).

It is also worthwhile to mention that the “scientific” constitution of a system of philosophy starting from a single principle can be linked in the same philosophical approach with the idea of a popular presentation of philosophy itself. As Schneiders observes, Descartes strove “for a popular notion of knowledge in his *Discours de la méthode*, but at the same time he (...) propagated an ideal of philosophy as a methodically constructed, strict science derived, if possible, from a single clear principle. In theory, philosophy became a universal science, representing an unshakeable system.” (Schneiders 2006, 30). This shows that the problem of a philosophical system, even put in a vague manner (e.g. in *Discourse*), could have achieved significance for a much broader public than we would have expected at that time.

Fourth, particularly significant is asserting the “idea” as a fundamental and exhaustive instrument of knowledge. It is easy to see that, in a certain sense, in the Cartesian model of the knowledge the mind does not know *things*, but *ideas*. The first “object” of knowledge is the idea itself, and ideas—their content and their existence—are the first and unavoidable intermediary of our relation to the being of things.

Equally important at this point is the fact that for Descartes “to know” means to relate / link ideas to each other, to establish a continuous chain between them, and, moreover, to do this in conformity with the “cognitive characteristics” of the ideas, taking into account the way ideas appear in mind, rather than following “the order of being.” As Descartes claims in Rule 6 from *Regulae*, in the chains of ideas “we are contemplating (...) the series of things to be discovered, and *not the nature of each of them* (my emphasis)” (Descartes 1985, 10 / AT, X, 361). Furthermore, he sees here the “secret of the method.”

Knowledge is thus the result of an approach that refers first of all to ideas, to their mechanisms of concatenation. This chaining itself forces us in a sense to say something (true) about things without knowing them “in themselves” (hence the

foreshadowing by the Cartesian cognitive model of Kantian phenomenal knowledge).

This could be formulated differently, pointing to the Cartesian division between *l'ordre des raisons* and *l'ordre des matières*. In a famous letter addressed to Mersenne, Descartes explicitly stresses the fact that “throughout the work [the *Meditations*, V.V.] the order I follow is not the order of the subject-matter (*matières*), but the order of the reasoning (*raisons*). This means that I do not attempt to say in a single place everything relevant to a given subject, because it would be impossible for me to provide proper proofs, since my supporting reasons would have to be drawn in some cases from considerably more distant sources than in others. Instead, I reason in an orderly way ‘from what is easier to what is harder’ (*a facillioribus ad difficiliora*) making what deductions I can, now on one subject, now on another. This is the right way, in my opinion, to find and explain the truth” (Descartes 1991, 163/AT III, 266). We find here again an expression of a mind attentive first of all to itself, to its own systematic construction, to its own ideational regularities, to its own deductive operative continuities.

Ortega y Gasset perfectly synthesizes the new epistemological situation, and the ontological significance of it, by comparing the Aristotelian and the Cartesian cognitive / alethic models: “The truth of thinking as thinking, for example that of a proposition, is posterior [in the Aristotelian tradition, V.V.] to the truth as the perceiving of Reality itself through intellect. This is why a true proposition, for Aristotle, always transcends itself—it speaks about real things and stands for them. The Principle of Contradiction proclaims that the Reality itself cannot be contradictory. But, for Descartes, the connection that *intuition* discovers and recognizes is one between ideas considered as such. The truth here is, first of all, a feature proper to the relations between ideas. Secondly, and as a consequence of the above, even the obvious or the *per se nota* truth does not have an external foundation to itself, but its evidence nevertheless possesses an inner foundation. The consciousness of a connection between two ideas is grounded in their simplicity” (Ortega y Gasset 1970, 261).

Hence, we note the importance of *the chaining of ideas*—a continuous, deductive chaining, which is implied in the entirety of Cartesian methodology—which will maintain the same high

level of relevance for Spinoza, who claims in his *Ethics* that “[t]he order and connection of ideas is the same as the order and connection of things” (IIp7). This chaining character further specifies in Descartes two other fundamental features of a system of knowledge: a totalizing character, and an ordering character.

This aspect could philosophically be expressed more broadly by speaking about the way in which a human being is conceived within modern thought as a “generalized” rational being, and the relevance of this conception for the problem of the system: “In the seventeenth century, a philosophical-anthropological notion of man as primarily a rational being had provided the basis for the unification of the sciences of nature and man, of morality and religion within a single system” (Koch 2006, 47).

Fifth, it is important to see the appearance of the system as being strongly favored by the Cartesian decision to develop and apply a philosophical *method*. The method cannot be understood (at least not here) as a purely mechanical procedure introduced into knowledge, but as an expression of a continuous “authority of reason” (in Victor Cousin’s words), which is “taking over” by arranging and ordering the whole of knowledge. As Descartes asserts in Rule 5 from *Regulae*, “the whole method consists entirely in the ordering and arranging of objects on which we must concentrate our mind’s eye if we are to discover the truth” (Descartes 1985, 20/AT XB 379). The method belongs thus to reason itself—or, more correctly, the method *is* reason itself, in its orderly function and progress, without any interference “from outside.”

From this perspective as well, the system appears to be a form essentially linked to modernity. These aspects understood and synthesized well by Victor Cousin: “The character of the philosophy of the Middle Ages is a character of submission to an authority other than reason. Modern philosophy recognizes only the authority of reason. It was Cartesianism which operated this decisive revolution. In the whole of [modern, V.V.] philosophy you have to search for three things: 1) the general character of this philosophy; 2) its positive method; 3) its result, or the system which leads to the application of this method” (Victor Cousin, “Douzième leçon. Des historiens de la philosophie,” in id., *Cours de l’histoire de la*

philosophie moderne, 2nd ed., 2nd series, 3 vols. Paris, 1847, vol. 1, 258–259, cited in Catana 2008, 227, n. 144).

This controlled progress of reason through the application of a method also expresses the need of the modern person to control reality, a control imposed on it by the evidence that characterizes Cartesian knowledge and expresses the criterion of the truth. From this perspective, the system which resulted from the application of a method of reason also represents the image of the continuous self-controlling of knowledge itself, and is thus linked with another fundamental fact of the modern subjectivity, namely *self-consciousness*. In other words, this self-control of reason expressed by the system has a necessary corollary in positing the knowing human being as a metaphysical subject and as being in essence self-conscious.

Gadamer also explicitly links methodology and the expression of this self-control in a Cartesian context: “[f]or us, methodological knowledge is a *self-conscious* procedure that accomplishes each step with self-control. Thus, ever since Descartes, self-consciousness has been the point at which philosophy secures its ultimate evidentness and, at the same time, the certainty of science secures its most extreme legitimation.” (Gadamer 2002, 124).

Sixth, I should stress the significance of reducing the essence of the material reality to *extension*, i.e. of the ontological assertion of *res extensa*. The Cartesian rejection of substantial forms and of sensible qualities of the Scholastics is well-known. Instead of a “complicated” picture of a multiplicity of individual essences, we find here a homogenous and unified ontological framework which demands that things are to be known starting only from extension and what it is immediately related to it (the figure and the movement of the bodies). So, the general ontological starting point in the realm of all sciences is one and the same, regardless of the kind of the being investigated, and what confers individuality / particularity upon them is only subsequently brought to their attention.

This means that we have to deal with the same essential attribute of all material things (as all ideational ones are related to the unique attribute of thought). This is crucial, as it allows us to “speak the same *language*” in all the sciences—the

geometric-cinematic one—when we attempt to about (only apparently) different things. In other words, we will no longer have—through this ontological reduction—*sciences* (in the plural), but only *Science*.

Moreover, this is not only a (somewhat predictable) linguistic and terminological unification, a system of mutually related epistemological signs (although this is itself of great importance for the future of modernity), but also a deeply related ontological homogenization and simplification. It could be also be called an epistemological “invasion” of nature by the category of relation, the fundamental contribution of a mathematical perspective in uncovering the knowledge offered by the world.

Put another way, instead of a qualitative universe, of a universe of ontological discontinuities, we will now have a world of relations that dynamically unite existences at the expense of intrinsic individualities and finalities.⁷ A mathematized ontology, as was proposed by early modern philosophy (under the decisive impulse of Descartes), equates with the thinking of things through their functional *relations*. The *equations* of mathematical physics offer the cognitive expression of this new image of the world.⁸

This also brings the adoption of another founding presupposition of the modern world: in the future, it will not be possible for any hierarchy to be easily associated with the framework of the universe, at least not as a “natural” one (aside, of course, from the expression of a purely quantitative power as an “objective” measure of all things). All things are somehow situated on the same ontological level, have the same “value” and “importance” for knowledge. In addition, the functional harmony described by mathematical thinking and that of the

⁷ “No need here for natural kinds or elements; no need for the Aristotelian plurality of substances, where things behaved the way they did because of their specific natures or essences. There was simply a material plenum whose behaviour at any given moment was derivable from the initial specifications of the ‘motion, size, shape and arrangement of its parts’” (Cottingham 2008, 71).

⁸ As Cottingham puts it, “[w]hat God does, in Descartes’s cosmology, is, as it were, to write the equations governing the behaviour of all the particles out of which the cosmos is composed—to determine the values of the mathematical constants that give our world its rhythm and shape and order” (Cottingham 2008, 264–265).

deisms that accompanied it comes from “inside” (is immanent).

As Ortega y Gasset remarks, “the Cartesian world, a mechanical one, is no longer a ‘Nature,’ and through his thinking, man does not belong to it anymore” (Ortega y Gasset 1970, 261). We should not forget in this context that for Descartes the soul—essentially understood as thinking—can be attributed only to man; animals and plants are reduced to the status of complicated mechanisms (see in this sense the final section of the *Principles of Philosophy*). Just as the watchmaker creates a clock from different pieces while appealing to some fixed mechanical principles, God himself—a “craftsman” with infinitely superior abilities—gives birth to a tree (for example), which is nothing else than very complex machinery made from very subtle pieces, imperceptible to the human eye.

So a unification introduced by the mind to all the sciences, a unification of the epistemological subject, corresponds to a unification of all things to be known, the homogeneity of physical reality itself. There is no longer an epistemological discontinuity within the cognitive process, no ontological hiatus within nature. The unity, the homogeneity, the continuity (and also the causal concatenation) are common structural features of the two realms, that of mind and that of corporeal reality. Obviously, we will find almost the same picture in Spinoza, who further introduces the idea of a perfect parallelism between the two realms, a “concomitant” expression of a unique reality, that of a single substance (God / Nature).

Following Lauth, and prior to a brief conclusion of the analysis of these points I have developed, I should note that Descartes “acknowledges and stresses vigorously the primacy of a system of knowledge compared to a system of the things themselves” (Lauth 2004, 239).

In my own words, then, we deal here with a system of knowledge (*systema cognitionis*) and not with a system of the world (*systema mundi*). Or, put another way, before being “of the world,” the system is “of the knowledge.”⁹

⁹ Of course, this observation favors a transcendental kind of understanding of human knowledge and transforms Descartes in a “forerunner” of Kant.

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RATIONALITY AND TRANSITIVITY IN SOCIAL EXPLANATION: LOGICAL-MATHEMATICAL ASPECTS

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Abstract:

The term “rationality” is applied to many different things, from beliefs and preferences to decisions and choices, actions and behaviors, people, collectivities, and institutions. Therefore this paper will limit its considerations only to social preferences and choices in order to clarify the role of rationality in social explanation. The paper will focus on degrees of rationality, calling upon the concept of transitivity for help.

Key words: rationality, transitivity, social choices, social explanation.

The term “rationality” is polisemantic. In his article about rationality, published in *A Companion to Epistemology* (eds. Jonathan Dancy și Ernest Sosa¹), L. Jonathan Cohen establishes nine types of rationality: 1) *Logical-Deductive Rationality*; 2) *Mathematical Rationality*; 3) *Semantical Rationality*; 4) *Inductive Rationality*; 5) *Probabilistic Rationality*; 6) *Factual Rationality*; 7) *Instrumental Rationality*; 8) *Teleological Rationality* and 9) *Comunicational Rationality*. In contrast, Wesley C. Salmon,² starting from the hypothesis that there are different degrees of rationality, believes that we need to consider at least the following forms of rationality: a) *Basic Deductive Rationality*; b) *Static Probabilistic Rationality*; c) *Kinematic Probabilistic Rationality*; d) *Dynamic Rationality*.

I did not pick these two examples arbitrarily. The first list shows us the main areas in which

rationality works, i.e. shows us the extensive register. The second list shows the degrees of rationality, i.e. the intensive register. As can be seen, the term “rationality” is applied to many different things, from beliefs and preferences to decisions and choices, actions and behaviors, people, collectivities, and institutions. Therefore this paper will limit its considerations only to social preferences and choices in order to clarify the role of rationality in social explanation. The paper will focus on degrees of rationality, calling upon the concept of transitivity for help.

So, if we accept that social subjects are finite and imperfect, we must also recognize that not all preferences and choices are rational. Some may be irrational to some degree, while others may be rational to different degrees. The idea that all preferences and choices of social subjects are rational is false. This can be logically proven in the following way.

Suppose that all preferences would be rational: $(\forall p) (p \rightarrow Rp)$ (where p is the symbol for “preferences” and R for “rational”). If this assumption is false, then we can write as follows: $\neg (\forall p) (p \rightarrow Rp)$. In that case, then obviously this result will be true: $(\exists p) (p \wedge \neg Rp)$. But because we have accepted that there exist degrees of beliefs and preferences, we can say generally that $(\exists p) \neg \Diamond R (p \wedge \neg Rp)$, which results from the following:

- 1) $(\forall p) \Diamond R(p \wedge \neg Rp)$ (assumption);
- 2) $(\exists p) \Diamond (Rp \wedge R(Rp))$ (from 1);
- 3) $(\exists p) \Diamond (Rp \wedge \neg Rp)$ (from 2).

As can be seen, the expression 3) is autocontradictory. So we have to accept its negation and the negation of 1). Moreover, it can be seen that the hypothesis $p \rightarrow Rp$ cannot be sustained. Thus we must accept as valid the expression $(\exists p) (p \wedge \neg Rp)$. Preferences are not only rational, but can also be

¹ Jonathan Dancy și Ernest Sosa, *Dicționar de filosofie cunoașterii*, vol. II, Editura Trei, București, 1993.

² Wesley C. Salmon, *Reality and Rationality*, Oxford University Press, 2005.

non-rational or irrational. That is, rationality is graded.

Now a very delicate matter appears. How do we make the transition from one degree of rationality to another? Of course, we have a partial transfer of rationality, not an entire one, which means that some elements pass from one grade to another, and thus are shared. But other elements will be substituted. How does this process happen? At this point we must take into account the fact that the grading of rationality involves comparison. In all degrees of rationality there is a common nucleus, an identity nucleus of rationality. There are other elements in addition to this nucleus, so there cannot be a strong identity, but an attenuated one.

Let us say, from the list by Wesley C. Salmon, that we have R_1 for *Basic Deductive Rationality*, R_2 for *Static Probabilistic Rationality*, R_3 for *Kinematic Probabilistic Rationality*, and R_4 for *Dynamic Rationality*. Thus, a class of $\{R_1, R_2, R_3, R_4\}$ is formed, and if one assumes a temporary partial identity, we would know that any particular form (let us say x) of R_1 also implies R_2 , R_3 , and R_4 . The mechanism of partial identity will then function in the following way:

$(\forall x) (R_1x \rightarrow R_2x)$ and

$(\forall x) (R_1x \rightarrow R_3x)$ and

$(\forall x) (R_1x \rightarrow R_4x)$.

Identity, of course, is a form of equivalence, and the equivalence relation has the properties of reflexivity, transitivity, and symmetry. But such a relation is too strong, permitting substitution operations.³ In that case we would have a total identity, which is not the case here, since in any empirical scientific demarche one cannot speak of a total identity, but only a partial one. If the identity is partial, then the symmetry of equivalence must be avoided. In this way a relation of order is being instituted (in comparison with the equivalence), born through the replacement of symmetry with anti-symmetry.⁴ One reaches anti-symmetry through a form of conversion of symmetry in which only the order of terms is changed, rather than the relation.⁵

For example, if we take the relation of order $\leq$, then the anti-symmetry property can be expressed in the following way:⁶

$$[(x \leq y) \wedge (y \leq x)] \rightarrow (x = y)$$

This emphasizes the fact that between the subordination of the relation of order $x \leq y$ and the conjunctive equation $x \cap y = x$ we have a very tight relation, since the common nucleus from the partial identity can only be x . From here the result is that, by replacing x in the relation of order, we have $x \cap y \leq y$. So, if we have $x \cap y = x$, then we also have $x \leq y$. This means that between the relation of order and the conjunctive equation, we will have an equivalence:⁷

$$(x \leq y) \leftrightarrow (x \cap y = x)$$

In other words, the common nucleus of a partial identity also allows us—because of the pointed equivalence—to substitute elements. However, one can also intuitively understand that identity in time implies the problem of persistence. In a partial identity, the nucleus assures a degree of persistence.

In the gradation of rationality proposed by Salmon, this nucleus is given by logical consistency, the principle upon which the first form of rationality is based—Basic Deductive Rationality. Each of the next three forms incorporate the initial nucleus (logical consistency), but also add new elements: “each succeeding grade is to be understood as incorporating the principles involved in the preceding grades.”⁸

Thus, the second form of rationality (second grade)—Static Probabilistic Rationality—includes the nucleus of logical consistency, but also assumes the principle of probabilistic coherence. “A minimal kind of probabilistic rationality is represented by the subjective Bayesians, who require only coherence. Coherence is a sort of probabilistic consistency.”⁹ And a “strict coherence is a sort of openmindedness requirement.”¹⁰ So, the concept of static rationality means a state of mind at any given moment that is free from logical contradictions (initial nucleus) and probabilistic incoherence. “To say that degrees of belief are coherent means that they are related in

³ See Ioan Biriş, *The Moral Values and Partitive Logic*, in vol. Valentin Mureşan, Shunzo Majima (eds.), *Applied Ethics. Perspectives from Romania*, Hokkaido University, 2013, pp. 80-81.

⁴ Alain Badiou, *Logiques des mondes*, Seuil, Paris, 2006, p. 170.

⁵ See Gheorghe Enescu, *Logica simbolică*, Editura ştiinţifică, Bucureşti, 1971, p. 167.

⁶ Alain Badiou, *Logiques des mondes*, p. 170.

⁷ *Ibidem*, p. 174.

⁸ Wesley C. Salmon, *Reality and Rationality*, p. 132.

⁹ *Ibidem*, p. 129.

¹⁰ *Ibidem*, p. 130.

such manner as to satisfy the conditions imposed by the mathematical calculus of probability.”¹¹

Kinematic Probabilistic Rationality requires Bayesian conditionalization. When we have new evidence in our experience, this is an occasion for review of one’s degrees of belief. In such circumstances we can use Bayesian conditionalization, which requires us to accept the value of the posterior probability calculated as our new degree of belief. Because our expected utilities are defined in terms of probabilities, says Salmon, probability is the very guide of life (if we are to behave rationally).

Finally, Dynamic Rationality is “a form of rationality that incorporates some sort of requirement to the effect that the objective chances—whether they be interpreted as frequencies or as propensities—must be respected, as well as other such rationality principles as logical consistency, probabilistic coherence, strict coherence, openmindedness, and Bayesian conditionalization.”¹² That is, in addition to the initial nucleus, this form includes all the principles of rationality from the previous degrees.

The concept of rationality was very important in the twentieth century. “This is true in academic philosophy, the behavioral and social sciences, and even—more recently—across the whole spectrum of academic fields, from the physical sciences at one pole to the humanities at the other.”¹³ A first step to obtain our confidence¹⁴ through rationality is captured by Wittgenstein’s statement: *Wir machen uns Bilder der Tatsachen* (We create representations of facts for ourselves). Of course, for the social explanation, interpersonal representations are important.

But what makes people accept or refuse cooperation? Do individuals see the same world when they cooperate and different worlds when they refuse cooperation? Or, in the words of Douglas Hofstadter: which world is best for an individual rational thinker?¹⁵ A world in which all individuals cooperate, or one in which all individuals refuse cooperation? In the case of social actions, we can

observe the behavior of various social agents. But are these observations sufficient to derive rational conclusions about the preferences of social agents?

For the purpose of social analysis,¹⁶ we are especially interested in binary relations, by those cases in which social individuals compare and evaluate two alternatives, say x and y . We can be in the following situations: 1) Non-strict preference between x and y , namely the social agent prefers alternative x at least as much as alternative y ; 2) Strict preference, in which alternative x , for example, is clearly preferred over alternative y ; 3) Indifference, namely the situation in which the social agent can accept both the order (x, y) and the order (y, x) as true.

Logically speaking, non-strict preference is connected (complete), meaning that the alternatives—whatever they would be—can be compared by social agent, excluding an answer like “I don’t know”; non-strict preference is transitive for any alternatives x , y , and z ; non-strict preference is anti-symmetric, meaning that for any alternatives x and y , if the order (x, y) is true and the order (y, x) is also true, then $x = y$. The properties of connexity and transitivity show us that the relation of non-strict preference is a relation of linear order, a rational relation (it allows transitivity). If it also has the property of reflexivity, then the order will be a weak order.

Concerning the relation of strict preference, this too has the properties of connexity and transitivity, but it is irreflexive, thus leading to a strong order. From all these properties, transitivity is equated with the condition of rationality, because the failure of transitivity leads to circularity, namely to irrationality (when the ordering of alternatives is not possible).

And if we accept that non-strict preference is rational (it allows the ordering of alternatives), then the relation of indifference is reflexive, symmetric, and transitive, and thus a relationship of equivalence.

What happens when we want to move from individual preferences to the social preferences? In other words, how can we aggregate individual preferences? Of course, the simplest situation is one in which all members of the social group choose the same alternative without exception, thus respecting the rule of unanimity. In this case, an alternative x is strictly preferred to alternative y by all members of

¹¹ *Ibidem*, p. 79.

¹² *Ibidem*, p. 141.

¹³ Stephen Toulmin, *Return to reason*, Harvard University Press, Cambridge, Massachusetts/London, England, second printing, 2003, p. 1.

¹⁴ *Ibidem*, p. 4.

¹⁵ Douglas Hofstadter, *Metamagical themas*, în *Scientific American*, vol. 248, no. 6, 1983, p. 22.

¹⁶ See also Ioan Biriș, *Filosofia și logica științelor sociale*, Editura Academiei Române, București, 2014.

the group, and so this is a clear social preference. Another way to find social preferences is by looking for consensus, which implies that an alternative x is not strictly preferred to y , and at least one member of the group strictly prefers x to y . This situation is called optimum-Pareto; the alternative x is not rejected by any member of the group, and it is preferred by at least one member of group. Other ways to find social preferences include simple majority, absolute majority, and qualified majority.

As can be seen, the optimum-Pareto works as long as the rule of consensus is available, namely as long as we do not have contradictory choices. But what happens when some members of group prefer x to y , and others prefer y to x ? Here the rules of majority can work, but we do not always have the conditions for majority. In other words, we are in the situation of needing to obtain a social aggregation by contrary preferences. A well-known solution for such cases is the Nash solution, or Nash-equilibrium. When the preferences of individuals are contrary, then we must establish which choice is rational for the group. Nash's answer is that we need to establish which choice maximizes the mathematical product of benefits.

Let us take a simple example, a group consisting of two people A and B. Suppose that the two people have to choose between four alternatives: in the first alternative no one wins anything (0, 0); in the second alternative A wins 5 units of utility, and B wins 9 units of utility (5, 9); in alternative III, A wins 6 units of utility, and B also wins 6 units (6, 6); in alternative IV, A wins 4 units, and B 10 units (4, 10), as can be seen in the following table:

Alternatives	A	B
I	0	0
II	5	9
III	6	6
IV	4	10

At first glance it would seem that the most fair choice is alternative III, in which every participant wins 6 units of utility. But Nash emphasizes that the rational solution for a social group is the solution which maximizes the mathematical product of benefits, namely the second alternative: $5 \times 9 = 45$.

The Nash solution is a *maximax strategy* (*maximum maximorum*). But there is also a *maximin strategy* (*maximum minimorum*), and in this case we would have to choose the least weak solution. This strategy is theorized especially by David Gauthier. Gauthier starts from the assumption that in any

cooperative endeavor, each player has to make some concessions, more or less. In a *maximin strategy*, to make a rational choice for the group should minimize the relative maximum concessions. But what is a relative maximum concession? To answer this question, take as example the same data from the table above. For agent A, alternative III has the highest benefit. If agent A compares the situation from the alternative III with the other alternatives, then he can see what is lost. Namely, agent A loses one unit in alternative II, and two units in alternative IV. As a rule, the relative maximum concession can be calculated by the formula:

$$C(A, x) = (U_{alt. max.}^A - U_x^A) / (U_{alt. max.}^A - U_0^A)$$

(where $C(A, x)$ is the relative concession of A in alternative x ; $U_{alt. max.}^A$ means the utility in the alternative where the agent A obtains the maximum possible; U_x^A is the utility of A in alternative x ; and U_0^A is the utility of A in the initial situation).

Let us now to calculate these concessions for the situations in the table.

First, alternative II:

$$C(A, 2) = (6 - 5)/(6 - 0) = 1/6; \quad C(B, 2) = (10 - 9)/(10 - 0) = 1/10$$

In this case, the biggest concession is by agent A: 1/6.

Alternative III:

$$C(A, 3) = (6 - 6)/(6 - 0) = 0/6 = 0; \\ C(B, 3) = (10 - 6)/(10 - 0) = 4/10 = 2/5$$

The biggest concession is by agent B: 2/5.

Alternative IV:

$$C(A, 4) = (6 - 4)/(6 - 0) = 2/6 = 1/3; \\ C(B, 4) = (10 - 10)/(10 - 0) = 0/10 = 0$$

Here the biggest concession is by agent A: 1/3.

From the values 1/6, 2/5, and 1/3, we retain the lowest value (1/6), which is the least weak solution. So, the rational solution for the group of agents A and B is alternative II.

But what happens when the groups of agents are larger, and the alternatives are more numerous? Often in these cases, the phenomenon of *circularity* of preferences appears, in which the condition of rationality (transitivity) is not satisfied: ($x > y$) and ($y > z$) but ($z > x$) (irrationality).

So we arrive at the paradox of Condorcet: when the number of alternatives (and the number of agents) increases, then the probability that the phenomenon of circularity will appear also increases. In these cases we cannot use the rules of

simple majority to establish a rational solution; we need more general rules.

Take the following as an example. The council of one townhall (which has 25 members) must to establish—by secret vote—an order of priority for building a house of culture (alternative x), repairing a school (alternative y), and repairing a street (alternative z). After the secret vote of the 25 councilors, we get the following result:

Nr. votes	6	3	2	6	4	4
The order of alternatives	x y z	x z y	y x z	y z x	z x y	z y x

Now it is important to check whether the phenomenon of circularity appears, because this vote must establish the preferred order:

$$x > y = 6 + 3 + 4 = 13;$$

$$y > x = 2 + 6 + 4 = 12. \text{ So, } x > y.$$

$$y > z = 6 + 2 + 6 = 14;$$

$$z > y = 3 + 4 + 4 = 11. \text{ So, } y > z.$$

$$x > z = 6 + 3 + 2 = 11;$$

$$z > x = 6 + 4 + 4 = 14. \text{ So, } z > x.$$

The results clearly show a situation of circularity, so irrationality. Given this, how can we establish a rational solution? A classic solution is *the solution of Condorcet*, which requires us to calculate the degree of preference for each order, and then choose the order that has highest score. So:

The order xyz : ($x > y = 13$; $y > z = 14$; $x > z = 11$);
 $13 + 14 + 11 = 38$

The order xzy : ($x > z = 11$; $z > y = 11$; $x > y = 13$);
 $11 + 11 + 13 = 35$

The order yxz : ($y > x = 12$; $x > z = 11$; $y > z = 14$);
 $12 + 11 + 14 = 37$

The order yzx : ($y > z = 14$; $z > x = 14$; $y > x = 12$);
 $14 + 14 + 12 = 40$

The order zxy : ($z > x = 14$; $x > y = 13$; $z > y = 11$);
 $14 + 13 + 11 = 38$

The order zyx : ($z > y = 11$; $y > x = 12$; $z > x = 14$);
 $11 + 12 + 14 = 37$

In our example, the order yzx has the highest score (40). According to the solution of Condorcet, this is the rational order in this case.

Another classical solution is the solution of Borda, a contemporary of Condorcet. The solution of Borda requires us to give scores to alternatives (for example, 1 point for third place; 2 points for second place; 3 points for first place). The score is multiplied by the number of votes in each order, and then the sum of scores is calculated, and the order is chosen in relation to their scores. So:

$$\text{For alternative } x: (6 \times 3) + (3 \times 3) + (2 \times 2) + (6 \times 1) + (4 \times 2) + (4 \times 1) = 49$$

$$\text{For alternative } y: (6 \times 2) + (3 \times 1) + (2 \times 3) + (6 \times 3) + (4 \times 1) + (4 \times 2) = 51$$

$$\text{For alternative } z: (6 \times 1) + (3 \times 2) + (2 \times 1) + (6 \times 2) + (4 \times 3) + (4 \times 3) = 50$$

The rational order according to Borda is again yzx , the same result obtained by the method of Condorcet.

These are classical solutions to the problem of circularity. Currently the problem of aggregation of preferences is the subject of numerous studies which cannot be detailed in this article. Here I emphasize only the main trends of this field.

But one can see by the solutions mentioned so far that a collective choice involves several conditions: a) free choice excluding dictatorship (non-D); b) independence of collective decision (I); c) optimum-Pareto (P); d) the condition of determination, namely the condition of the possibility of social preferences (Det.).

Concerning these conditions, Kenneth Joseph Arrow has formulated the *theorem of impossibility*, which tells us that there can be no aggregation of individual preferences that simultaneously meets all of these conditions. That is, a collective transitive choice is impossible.

Attempts to overcome the Arrow's theorem follow two paths: 1) the weakening of transitivity; 2) a more nuanced analysis of the structure of individual preferences.¹⁷

Regarding the first way, the idea is that collective choices must be representative of individual preferences. To ensure this representativeness, we need the conjunction of

¹⁷ See Hugues Lagrange, *Théorie politique formelle*, in vol. Madeleine Grawitz et Jean Leca (eds.), *Traité de science politique*, vol. I, Presses Universitaires de France, Paris, 1985.

conditions P and I (*optimum*-Pareto and the condition of independence of collective decision). In this case, we will also have transitivity.¹⁸

However, the condition of transitivity is sometimes very problematic, as it is too strong. Therefore, Amartia Kumar Sen proposes a weakening of transitivity. This weakening can be by *optimum*-Pareto taken in a broader sense: an option is socially preferred in a broad sense ($\geq_p$) if there is no other dominant option. The rule of Sen can be expressed as:

$$(x \geq_p y) \Leftrightarrow \neg [(\forall_i y \geq_p x) \wedge (\exists_j y \geq_p x)]$$

This rule of Sen allows us to satisfy of the conditions of Arrow's theorem.

The second way focuses on the study of the structure of individual preferences. If we consider how Condorcet's paradox occurs, we can have the following situation:

For individuals from subassembly 1 (S_1) $x \geq_p y \geq_p z$;

For individuals from subassembly 2 (S_2) $z \geq_p x \geq_p y$;

For individuals from subassembly 3 (S_3) $y \geq_p z \geq_p x$.

Social Result $z \geq_p x \geq_p y \geq_p z$

Now we can see that in this structure of preferences each option is at once the best, the intermediate, and the worst option for one of the members of the group.¹⁹

So it is necessary to reduce as much possible those distributions of options which lead to the paradox of Condorcet. To this end, we can study the distribution of options using spatial representations,

and if in a space of individual preferences we can establish a *dominant point* (x^*) and the relation $x^* \geq_p z$ (z being any other option), then for the alternatives x , y , and z , we can obtain the following relation of preference²⁰:

$$y \geq_p z \Leftrightarrow |y - x^*| \leq |z - x^*|$$

This relation is transitive, and the paradox of Condorcet is excluded.

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¹⁸ *Ibidem*, p. 186.

¹⁹ *Ibidem*, p. 189.

²⁰ *Ibidem*, p. 220.

ARITHMETIC AS PROPAEDEUTIC TO THEOLOGY: THE BRETHREN OF PURITY*

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Abstract:

In the 10th century, the Brethren of Purity conceived a henological arithmetic which they believed could explain the mathematical structure of the cosmos (as a macro-anthropos), and could lead the student to the discovery of the real substance of his own soul (as a micro-cosmos), a discovery which is the first step towards knowledge of metaphysical and theological truth.

Key words: Brethren of Purity, henology, theology, arithmetic, one.

Some years ago I was asked to review the Ikhwān al-Safā's (in English the "Brethren of Purity's") epistle *On Logic*.¹ At the time I already knew some Arabic logic by al-Fârâbi and Ibn Rushed, and I was anxious to know how a tenth century (fourth century in the Hegirian calendar) Ismailia esoteric fraternity of lettered urbanities would deal with such a technical subject as logic. It should be no surprise that the *Epistle on Logic* is a loose commentary on Aristotle's *Organon* which includes some Stoician doctrines, and for theological reasons passes over Aristotle's discussion of contingency and modality in the *De Interpretatione*.

But the *Epistle on Logic* is only one of fifty-two epistles (one for each week of the solar

calendar). These fifty-two epistles constitute an encyclopedia of what a learned man—not a confirmed philosopher—of southern Iraqi is supposed to know in the tenth century.

Except for the rather deceiving *Etymologia* of Isidorus from Seville, nothing comparable existed at the time in the western Latin world. The avowed intention of the Brethren of Purity was:

“... to study all the sciences of existent beings that are in the world, be they substances, accidents, abstract entities, simple or compound, and to inquire into the principles and the quantity of that species, kinds, and properties, and into their arrangement and order, as they are present, as well as into the process of their originating and growing out of one cause and of one origin, by one Creator...”²

In other words, they intended to present a complete henological cosmology originating from *one* cause, *one* origin, and *one* creator. But how to build such a cosmology? And how to start building it?

The Brethren of Purity distinguishes four kinds of philosophical sciences: “the first is the propaedeutic sciences, the second is the logical sciences, the third is the natural sciences, and the fourth is the theological sciences.”³ Here it

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¹ *Epistles of the Brethren of Purity, On Logic*, an Arabic Critical Edition and English Translation of the EPISTLES 10-14, Edited and Translated by Carmela Baffioni, foreword by Nader El-Bizri, Oxford UP, 2010.

² *Epistles of the Brethren of Purity, On Arithmetic and Geometry*, an Arabic Critical Edition and English Translation of Epistles 1 & 2 by Nader El-Bizri, Oxford University Press with The Institute of Ismaili Studies, 2012, p. 65.

³ *Id.*, *Ibid.*, p. 65.

is important to make a comparison with philosophical-scientific categories in the medieval western Latin world. There, from Cassiodorus onward and later Lanfranc, the logical sciences are part of the *trivium* (grammar, rhetoric, and logic), and the disciplines of the *trivium* constitute, for the western Latin world, the propaedeutic sciences. In the 12th century, learning the disciplines of the *trivium* made you a Master of Art. After the *trivium*, the disciplines of the *quadrivium*⁴ (arithmetic, geometry, astronomy, and music) may be learned. The *quadrivium* is not propaedeutic.

For the Brethren of Purity, contrary what would be thought in the later Latin world, the *quadrivium* is propaedeutic: “The propaedeutic sciences are of four kinds: the first is arithmetic, the second is geometry, the third is astronomy, and the fourth is music.”⁵ Arithmetic “...is the study of the properties of numbers and the qualities of the existents that conform to them, following what Pythagoras and Nicomachus⁶ recorded in this regard,”⁷ while geometry “...is the science of mensuration by means of proofs recorded in the book of Euclid.”⁸ Astronomy “...is the science of the stars,”⁹ and music “...is knowledge of the composition of sounds.”¹⁰

Arithmetic, they say, “...is the easiest science to acquire,”¹¹ an assertion few of my students would agree with. But we have to keep in mind that this arithmetic is propaedeutic to a henological cosmology and theology. As we

shall see, the Brethren of Purity claimed that the world had been created in a mathematical way. To know this order leads you to discover the real substance of your soul, makes you capable of understanding the metaphysical truth, and—last but not least—makes you capable of understanding the theological truth.

But how can we build a henological arithmetic? The Brethren’s first observation is that any number may be reduced to *one*—which is not a number—in the following way:

“...if one is taken from ten, then nine remains; and if one is taken from nine, eight remains; and when one is taken from eight, seven remains; and similarly ones are taken away until only one remains.”¹²

Once again we have to remember that arithmetic as here conceived is the ground for a cosmological henology. The consequence is that the *zero*—an Indian invention which an Arabic mathematician will only later introduce into the Western world—cannot be conceived by the Brethren of Purity: “...nothing can be removed from one, because (by definition) a part cannot be taken from it.”¹³ A further consequence of this logic is that there are no negative numbers.

The Pythagorean numerology developed by the Brethren of Purity is dependent on the language they use. They make the observation that:

“Twelve single words [...] suffice to encompass all the names of the numbers, namely, [the numbers] from one to ten are covered by ten words; and one word, ‘hundred’; and one word, ‘thousand’; so there are twelve single words in all. The other names [for numbers] are derived from these, or combined from them, or are a repetition of them.”¹⁴

This would not be true in either English or French. In French, for instance, the first ten numbers do not encompass the following

⁴ As Nader El-Bizri writes in his “Introduction” that the classical *quadrivium* curriculum was “conceptually attributed to Pythagoras of Samos, and ‘institutionally’ elaborated by Anicius Manlius Severinus Boethius,” p. 2.

⁵ Epistles of the Brethren of Purity, *On Arithmetic and Geometry*, p. 66.

⁶ Nicomachus of Gerasa wrote an *Introduction to Arithmetic* (Nicomachi Geraseni Pythagorei Introductionis arithmeticae, ed. R. Hoche, Leipzig, Teubner, 1886) and the *Theological Principles of Arithmetic* (Theologumena arithmeticae, ed. V. de Faco, Leipzig, Teubner, 1922).

⁷ Epistles of the Brethren of Purity, *On Arithmetic and Geometry*, p. 66.

⁸ Id., *Ibid.*, p. 66.

⁹ Id., *Ibid.*, p. 66.

¹⁰ Id., *Ibid.*, p. 66.

¹¹ Id., *Ibid.*, p. 67.

¹² Id., *Ibid.*, p. 68.

¹³ Id., *Ibid.*, p. 68.

¹⁴ Id., *Ibid.*, p. 69.

numbers all the way up to sixteen (*seize*), neither do they encompass twenty (*vingt*), thirty (*trente*), and so on.

But there is another thing at stake: the last word for numbers is the word ‘thousand’—there is no word for the *infinite*, nor for the *indefinite*. Did the Brethren of Purity have the notion of the infinite? In a way, like in the French translation of the *Arabic Nights* (*Les Mille et une Nuits*) the idea of an impossibly large number is captured by “a thousand-and-one.”

In any case, as the Brethren of Purity have told us, any number can be reduced to *one*. In this way the relation of the unit *one* to all the numbers is like the relation of the Creator—or the platonician *en*—to all existence.¹⁵ The Brethren now need to solve the classical problem in henology: how can we move from *one* to *multiplicity*? The solution is evident: “Plurality is an aggregate of ones,” and “the first of the plural numbers is two,”¹⁶ and “One, which precedes two, is the source and principle of all numbers...”¹⁷ *One*—as the principle of all numbers—is not a number; *two* is the first of the numbers.

If *one* is the source and principle of all numbers, the number *four* is also a very important number: “...most of natural things were established by the Creator (...) in fourfold order.”¹⁸ In this way the number *four* is like prime matter.¹⁹

The various assertions of the Brethren’s about the meaning of specific numbers has to be considered in relation to the science of their time and their geographic situation.

The first two lines of argument are taken from Aristotle’s physics: there are “...four natures: heat, cold, dampness, and dryness”; then there are “...four elements: fire, air, water, and earth.” The third is taken from antique medicine: there are “...four humors: blood,

phlegm, and the two biles, yellow bile and black bile.”

These three arguments are, of course, completely obsolete for a 21st century reader. From Lavoisier and Einstein to the discovery of neutrinos and Higgs bosons, we know that the real “natures” and “elements” are not what Aristotle thought they were. And modern medicine has nothing to do with the antique theory of “humors.”

The fourth argument provides some clues about the region where the Brethren of Purity lived: there are “...four seasons: spring, summer, autumn, and winter.” In the twelfth century, Ibn Tufayl, though he lived in Spain, knew that under the equator there were only two seasons, a dry one and a wet one. The notions of spring, summer, autumn, and winter depended on the place where you lived.

The fifth line of argument cannot even agree with the meteorological science of Herodotus: there are “...four winds: the east wind, the west wind, the south wind, and the north wind.” Winds do not restrict their directions to the cardinal points. In Southern France the “Mistral” is a south wind, the “Tramontane” a south-east wind...

The sixth argument seems very Pythagorean: there are “...four orientations, upward, downward, right and left...” but another Pythagorean, the Jewish philosopher Philo of Alexandria, claimed in the first century PCN that the number of orientations proves the importance of the hexade (number six): men and animals can move upward, downward, right and left, but also forward and backward...

The seventh one argues that there are “...four *cardines*,” which is still the basis of our geography. But these four cardines are “...the ascendant, descendant, *medium coeli*, and *imum coeli*...” This proves that the Brethren of Purity lived a long time before the invention of the compass. Their vision of the world was determined by the place where the sun is rising (like some old Arabic maps), and was not already northward directed.

The eighth and final argument is that there are “...four [sub-lunar] beings: metals, plants,

¹⁵ Cf. Nader El-Bizri’ “Introduction,” p. 17.

¹⁶ Epistles of the Brethren of Purity, *On Arithmetic and Geometry*, p. 68.

¹⁷ Id., *Ibid.*, p. 68.

¹⁸ Id., *Ibid.*, p. 71.

¹⁹ Cf. Nader El-Bizri’ “Introduction,” p. 17.

animals, and humans.” This eludes the long discussed theological question about devils and angels: are they sub-lunar beings or not?

But, whatever objections we may make to their arguments, we must consider that for the Brethren of Purity, the Creator had established natural things in a fourfold order. This is the reason why the number *four* is related to prime matter. As a consequence, they think that the set of numbers²⁰ from one to four (1=Creator, 2=Active agent, 3=cosmic universal soul, 4=prime matter) is the origin of all numbers, and that the Creator, the active agent, the cosmic universal soul, and prime matter are the origin of all existence in the sub-lunar world. Indeed, as all conceivable numbers could be named with only twelve entities (from one to ten, plus the numbers “hundred” and “thousand”) in a perfectly Pythagorean combinatory way, the first four numbers are “the source of all the numbers.” For example, five and six are mere additions: “...when you add one to four, the total is five,” “...when you add two to four, the total is six,” Let’s take the case of seven: “...when you add three to four, the total is seven,” You can proceed again in a perfectly combinatory way: “...when you add one and three to four, the total is eight.” And again “...if you add two and three to four, the total is nine. Finally you come to the Pythagorean Tetractys: “...when you add one and two and three to four, the total is ten.”²¹ And, in order to name all the numbers, you just need two more words, “hundred” and “thousand.”

Numbers have special properties:

One—which is not a number—is the source of all the numbers, generating all numbers, both odd and even.²² But *one* itself is neither odd nor even.

The Brethren of Purity had a problem conceiving the infinite (Aristotle had similar problems), and they think that a special property of the number *two* is “...that it generates half of

the numbers, the even numbers as opposed to the odd numbers.”²³ In post-Cantorian mathematics, half of the infinite is still infinite. But we are not allowed to quarrel with the Brethren of Purity for not having read Cantor...

Another special property of the number *two* is that “...it is absolutely the first whole number.”²⁴ The number *two* is like the Active Intellect.²⁵ Similarly the number *three* has the special property of being “...the first odd number”²⁶ (which incidentally means, just as we said a few lines ago, that *one* is not an odd number, nor of course an even number). Furthermore *three* has the special property that “...it generates a third of the numbers, some odd, some even.”²⁷ A third of the infinite is still, in post-Cantorian mathematic, an infinite... Nevertheless the number *three* is like the cosmic universal soul.²⁸

The Brethren of Purity conceived of the number *four* in a typically Neopythagorean way, that is to say, through spatialization: “A special property of [the number] four is that it is the first perfect square.”²⁹ It is just as if the units were stones, and that you need to arrange them on the sand to see which geometrical figure they corresponded with. It is worth noticing that only two stones (in the Euclidian sense) can define a straight line, while with four stones you can make a square—but also a rectangle, a diamond, or any quadrilateral figure. The choice of a “perfect square” provides some clues about the way the Brethren of Purity saw the world (as a world with regularity and symmetry). The world is mathematical.

The number *five* also has some special properties: “it is the first circular number, also called ‘spherical.’”³⁰ With five stones on the sand, you can draw an infinite number of figures. The two regular figures are the

²³ Id., *Ibid.*, p. 75.

²⁴ Id., *Ibid.*, p. 75.

²⁵ Cf. Nader El-Bizri, p. 17.

²⁶ Id., *Ibid.*, p. 76.

²⁷ Id., *Ibid.*, p. 76.

²⁸ Cf. Nader El-Bizri, p. 17.

²⁹ Epistles of the Brethren of Purity, *On Arithmetic and Geometry*, p. 75.

³⁰ Id., *Ibid.*, p. 76.

²⁰ Assuming that *one* is not really a number.

²¹ Epistles of the Brethren of Purity, *On Arithmetic and Geometry*, p. 72.

²² Id., *Ibid.*, p. 75.

pentagon and the circle. As children learn at school, a perfect pentagon first requires the drawing of a circle with a compass, and then drawing the five heads of the pentagon. So the circle has a technical—and maybe an ontological—priority to the pentagon. So the Brethren's longing for regularity and symmetry may be the reason why the circle was the specific geometrical form of the number *five*.³¹

The number *six* has a very interesting special property: it is the first perfect number, in the sense that it is equal to the sum of all its divisors:

“...a special property of the number six is that it is the first perfect number; namely, if the divisors of a number add up to itself, it is called a perfect number, and six is the first of them. Six has a half, which is three, and a third, which is two, and a sixth, which is one, and if these divisors are added up, the sum is equal to six. No number before six has this property, but after it is the number twenty-eight, then 496, and after that 8,128, and all are perfect numbers.”³²

So $6/2=3$, $6/3=2$, and $6/6=1$, so $3+2+1=6$. That proves that *six* is a perfect number. As an exercise you might try to prove that 28, 496, and 8,128 are also perfect numbers, and to discover the following ones.³³

It is hard to find a special property of the number *seven*. It is a prime number, so it has no chance at all to be a perfect number. And the regular geometrical figure associated with it—the heptagon—is not easy to construct, even with a compass. Nevertheless, the Brethren of Purity think that the special property of *seven* is that “...it is the first complete number.”³⁴ The Brethren of Purity were Shiites, but there are

some references to the Jewish Law, as well as to the Holy Scriptures of Christianity and the Koran. In Genesis, God completed creation in six days, and on the seventh day he rested. The seventh day is a day of completion. Furthermore the very old notion of a seven-day week is determined by the 28-day lunar calendar. So there are four weeks ($7 \times 4 = 28$) in a month, and each week is a complete entity. But there is another mathematical reason for *seven* to be complete: “If the first odd number is added to the second even number, or the first even number is added to the second odd number, the sum is seven.”³⁵

Accordingly $3+4=7$ and $2+5=7$. We may wonder whether there are any other complete numbers...

The number *eight* leads to a three-dimensional representation: the special property of the number *eight* is that “it is the first perfect cube.”³⁶ As $8=4+4$ (and 4 represents a perfect square), a perfect cube is drawn by two squares in two different—but symmetrical, equally distant—planes. But if you throw four stones on the sand, and you can imagine another plane of sand which is exactly parallel to the first one and upon which you then throw another four stones, are you sure to have a cube?

The Brethren of Purity just suppose that there is symmetry and regularity in the world. The world—as a macro-anthropos—is a mathematical creation.

This is even clearer with the first special property of the number *nine*, which “...is the first odd perfect square.”³⁷ Indeed, nine is an odd number, and if you arrange three ranks of three stones ($3 \times 3 = 9$) with perfect regularity and symmetry, you will get a perfect square.

But this again requires perfect regularity and symmetry. Once again the world is mathematical.

Nine has another special property: “...it is the last of the ranks of units.”³⁸ Which means that the Brethren of Purity adopted a decimal

³¹ I have not yet found an explanation for why *five* can be called “spherical,” which supposes a third dimension that will appear only with numbers *eight* and *nine*.

³² Id., *Ibid.*, p. 77–78.

³³ Good luck! I finally succeeded with 28, but I prefer not to try with 436 and 8,128, and I’ll let you discover the following perfect number by yourself.

³⁴ Epistles of the Brethren of Purity, *On Arithmetic and Geometry*, p. 76.

³⁵ Id., *Ibid.*, p. 78.

³⁶ Id., *Ibid.*, p. 76.

³⁷ Id., *Ibid.*, p. 76.

³⁸ Id., *Ibid.*, p. 76.

system and gave up the duodecimal system (which still bears some importance), as we will see with number *twelve*.

In my opinion, the reason for the importance of the number ten is very close to the reason found in Pythagoras' *Tetractys*. Its special property is just that "...it is the first number of the ranks of tens."³⁹ Once again, we are in a decimal system...

Eleven is a difficult case. As a prime number it seems it might not represent a perfect number. Furthermore it is not a complete number. We can hardly conceive a regular geometrical figure corresponding to it. So its special property is that "...it is the first deaf number."⁴⁰ In other words, the special property of *eleven* is that it has no special properties.

Finally, number *twelve* "...is the first abundant number."⁴¹ But what does it mean to be an *abundant* number? As we said, every conceivable number has a name that is a combination of the names of the twelve numbers (from one to ten, then the numbers "hundred" and "thousand"). And even if we do not know whether the number of the numbers is infinite or not, the number of the numbers is still abundant. But there may be other reasons. The Brethren of Purity did not live far from old Babylon, with its duodecimal system. The Chaldeans composed its solar calendar year with twelve months, corresponding more or less to the cosmological signs of the Zodiac. The number of hours of daylight is twelve. And even as far as in Belgium, eggs are sold in 12-pieces boxes (in time of economic crisis—i.e. when you are not in abundance—you would buy six

eggs, which is half of twelve, or if you really suffer from crisis, you would buy four eggs, which is a third of twelve). So *twelve* is a number of abundance.

Now we come to the central question. How can such a conception of arithmetic be propaedeutic to theology?

Man is a micro-cosmos, and the world is a macro-anthropos. When a man learns the mathematical structure of the world, he learns about himself as well. He learns about his own soul, its origin, its location before its embodiment, when it was joined with the body. The knowledge of numbers is the main door to knowledge of the soul, which is the prerequisite to knowledge of theological truth.

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³⁹ Id., *Ibid.*, p. 76

⁴⁰ Id., *Ibid.*, p. 76.

⁴¹ Id., *Ibid.*, p. 76.

EMPIRICAL, MATHEMATICAL, AND LOGICAL KNOWLEDGE IN HEGEL

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Abstract:

This paper considers the rediscovery of Hegel currently taking place in the analytic philosophy. Going back to the Hegelian texts themselves, I will try to show how they can help to decisively solve some problems of contemporary philosophy. I will concentrate on the theme of knowledge, and especially mathematical knowledge, in relation to Hegelian dialectical logic.

Key words: Hegel; analytic philosophy; empiricism; mathematics; logic.

1. Introduction

What is the purpose of examining the themes of knowledge and mathematics in Hegel? Before going on with Hegel's philosophy itself, I will introduce my article by briefly summarizing the history of this subject in analytic philosophy in three stages of approximately fifty years each, which could schematically correspond to the beginning, middle, and end of the 20th century.

- 1) With the exceptions of Adolf Trendelenburg (Trendelenburg 1843; regarding his relation to Hegel, *cf.* Peckhaus 2013) and Bernhard Bolzano (Bolzano 1851; about his relation to Hegel, *cf.* Pégny 2013) in the 19th century, the philosopher who has most contributed to discrediting Hegel and to excluding his thought from entering into discussions on philosophical and logical topics is certainly Bertrand Russell. Starting in 1898, Russell harshly criticized Hegel's contradictory "monism" as the peak of that old-fashioned type of philosophy called metaphysics, to which he opposes his own logical atomism: "When I say that my logic is atomistic, I mean that I share the common-sense belief that there are many separate things; I do not regard [as opposed to the monistic logic of the people

who more or less follow Hegel] the apparent multiplicity of the world as consisting merely in phases and unreal divisions of a single indivisible Reality" (Russell 1971, 178).

We can remark that Russell here already stresses the problem that will be considered in this paper: the question of the relationship between the unity of "Reality" and the varieties of our modes of knowledge, which Hegel, on principle, would not respect, but rather absorb in his monistic logic. This statement seems to hold exemplarily for mathematical knowledge, which would suffer violence in the name of unsustainable logical requirements: "All the arguments used by Hegelians to condemn the sort of things dealt with by mathematics and physics depended upon the axiom of internal relations. Consequently, when I rejected this axiom, I began to believe everything the Hegelians disbelieved [them who think that mathematics is not quite true]" (Russell 1959, 62). On the basis of this Russellian controversy against British Idealism (especially against Bradley), analytic philosophy long held a distorted image of Hegel, seeing him as a totally unscientific philosopher who should be either ignored or vehemently rejected.

- 2) But the history of philosophy did not, of course, stop there. Russell's logical types theories, e.g. those shown in *Principia Mathematica*—such as the Russellian correlated distinction between "knowledge by acquaintance" (immediate empirical) and "knowledge by description" (logical) (Russell 1912, 72–92)—were to be more problematic and 'metaphysical' than they first appeared, and this coming from the analytic tradition itself. So, facing these difficulties (which will be briefly noted in the course of this article),

the analytic tradition undertook a “pragmatic turn” in the middle of the century, with authors such as Strawson, Austin, Linsky, and Sellars. They refuted the Russellian separation between language and consciousness, logic and experience, and—in the vein of logic—between propositions and enunciations. In this way, analytic philosophy made an implicit return to a more Hegelian way of thinking.

- 3) If we move another half-century forward to reach our present, we discover that this parallel between the two philosophies has become explicit and openly assumed by contemporary philosophers, such that there has been a real “return of Hegelian thought” (Redding 2007) within the framework of analytic philosophy, including major philosophers like Brandom, McDowell, Pinkard, Pippin, etc.

Even if this *return of* is not actually a *return to*, I think it is obvious that contemporary philosophy would benefit from a reconsideration of the Hegelian texts themselves, which I will briefly undertake in this paper regarding the topic of knowledge. One of the biggest stakes in this renewal is the notion of “system”—not a well-regarded concept amongst most contemporary philosophers, but central in Hegelian philosophy. I will concentrate on the question raised by Russell: the possible conciliation of Hegelian systematic “monism” (the significance of which will need to be demonstrated) and the varieties of our modes of knowledge (which Hegel never denies, though Russell may have thought he did). In paragraph 259 of his 1830 *Encyclopedia*, Hegel asserts that he wants to create a system according to three different types of knowledge: empirical knowledge, mathematical or formal knowledge, and philosophical or logical knowledge. We will see that this triple division corresponds as much to a critical reconstruction of some points of view from the history of philosophy and the sciences as it does to a system trying to solve some of their contradictions.

The theses I will defend here are the following: Hegel wants to denounce the unilateral character of empirical knowledge on the one hand and mathematical knowledge on the other hand, insofar as they are either made absolute in an exclusive way as the unique origin of our knowledge, or placed together in front one of another (what commentators would call “empirico-formalism”; we will see that for Hegel every consequent empiricism or formalism turns itself to an empirico-formalism, by ways which

we will explore). Because these modes of knowledge cannot justify themselves and their own presuppositions using their own tools, they fall into contradictions, and Hegel can qualify them as “metaphysical.” So, ironic though it may be, Hegel had partly anticipated and denounced some of the deadlocks of the future philosophy—mostly Russellian—and tried to solve them in a very original way. This is the project of the Hegelian system of philosophy, conciliating these different modes of knowledge in a system able to avoid the difficulties of the axiomatic immediate linear foundation of knowledge, as well as modes and foundations containing trivial circular reasoning (the διάλληλος τρόπος of Agrippa). I will try to show how, in this way, Hegel wishes to break with formal logic, as with the persistent formalism of Kantian transcendental logic. Let us now explore step by step the three spheres of the empirical, mathematical, and logical types of knowledge, showing how Hegel simultaneously criticizes them and redeploys them in a systematic totality.

2. Empirical knowledge

The fact that Hegel criticizes empiricism, radicalizing the perspective of Kant, is well-known. What is less-known is his will to, if I can express it this way, not leave empiricism to empiricists (nor to Kantians), meaning that his intention is to show the true—speculative—character and nature of experience. This refusal of empiricism is very important to many contemporary philosophers, like Brandom or McDowell. I will show in the first section below (A) how Hegel decries the contradiction of the empiricist conception of experience. Then in the following section (B), I will show how, despite or maybe because of such harsh criticism, Hegel integrates experience into his own system in *Phenomenology of Spirit*.

A. The contradictions of empiricism

The Hegelian arguments against empiricism, for which the question of language is central, are actually quite close to the ones of Wittgenstein (*cf.* Lamb 1983). What does Hegel have in mind? Empiricism holds perception (*Wahrnehmung* in German, “Truth-taking”) and the analysis of this perception (understood as a quantitative decomposition) as the sole purveyor of truth. But according to Hegel, this discursive analysis does not respect the immediate truth of its presupposed sensible object. It introduces a mediation (the act of knowing) that transforms the known object. This

theoretical mediation is of a linguistic and logical nature. So we can say that such a privileging of analysis makes the status of empiricist discourse problematic, since empiricism presents itself as a synthetic and universal production of sense which is irreducible to the ontological choices made besides. For example, the simple sentence “every truth is empirical” cannot find confirmation in empirical perception.

This is where Hegel can point to the contradictory and properly metaphysical character of empiricism: “The fundamental illusion of scientific empiricism is always this: it uses the metaphysical categories of matter and force, as well as the categories of one, multiple, universality, infinity, etc. (...), in doing so, the empiricist does not realize that he practices a metaphysics and uses these categories and their relations in a totally uncritical and unconscious way” (Hegel 1970², 108–109 §38).

Metaphysics is, above all, the method of the philosophical discourse that is unable to justify its validity following its own criteria of truth. We also see here how the consequent empiricism always turns itself into an *empirio-formalism*. So, in opposition to Hume—who thought that the connection between empiricism and thinking could still be understood more or less on the (antique) model of resemblance (in which ideas are considered to be diminished traces of sensitive impressions)—the fact that empiricism integrates the discourse of reporting, justifying, and explaining experience into the concept of experience itself obliges us to look for a different way of thinking. Hegel calls this proposed alternative way “representation,” a method characterized by the relation between form and contents, a much more difficult way of thinking than resemblance (for example, the word “book” does not look like a book, nor does “ $x^2+y^2=1$ ” look like a circle). The challenge here is thus to create a philosophical discourse which takes into account the possibilities of its own application to and within experience in a non-contradictory way, a logical discourse sustaining the semantic difference between form and content.

I have summarized here the Hegelian critique of empiricism; I will now show how Hegel attempts to overcome these contradictions, whose persistence would force us to remain prisoners of skepticism.

B. *The Phenomenology of Spirit*

The challenge here, to avoid the contradictions of a pure perceptual paradigm, is to undertake “a considerable reworking of the concept of experience

in a clearly *auto-referential* standpoint” (Tinland 2013: 39), so that a theory of experience is able to justify itself using its own language. The famous *Phenomenology of Spirit* undertakes such a reworking; here I examine only the first chapter.

In “sensible certainty,” Hegel wants to show that it is possible for us to know particular, “immediate” (or “given”) empirical objects only through mediation by our linguistic, logical universal categories, always presupposed in our act of knowing due to the simple fact that a human is speaking. Using language to report its own sensible experience, consciousness realizes that “the sensible thing [the immediate particular object] that is meant [*gemeint*] is *unattainable* [for] language” (Hegel 1970¹, 91–92), as words deal with universality. And as “language is [...] the truest” (Hegel 1970¹, 85), we can understand the deep revision taking place here.

Asserting that language is always already at work in our conscious experience may first seem to be a reconstruction of transcendental conditions within the framework of empirical knowledge itself, as Charles Taylor argues (Taylor 1972), in a kind of self-criticism of empiricism. However, we need not understand Hegel’s logic as a simply Kantian logic. If it really is, according to the famous Hegelian claim, a “logic of contents,” then it is much stronger than that. The challenge for Hegel is to break with discourse considered as a simple tool or medium that has the capacity to make immediately present some external known object, as in the Russellian theory of proper names. Instead, the point here is to build a discourse that does not systematically move toward an external object, but rather builds on the model of Kantian synthetic *a priori* acts of consciousness. This is exactly what Hegel seems to do in his *Science of Logic*, in a reflexive and non-axiomatic discourse, assuming in itself the difference between form and contents. In other words, we could characterize it as a method of discourse which includes within itself its own meta-discourse, providing reasons for what is known when we assert something. This is not an idealist method—for which we would only have access to language and never to the real world—but in a strong realist method, in which the essence of things is itself an essence of thought, as Hegel claimed many times.

Here is the point at which we discover the closest parallel to Wittgenstein in the *Philosophische Untersuchungen*, according to whom my act of knowing or even feeling something has an objective

value, because I must employ language that exceeds me (as there is no personal language), proof of the objective rooting of my experimental knowledge of the world. This is also where we meet the social and pragmatist Hegel of Robert Brandom and others contemporary American philosophers.

Before proceeding to examine the limits of mathematics for establishing such a philosophical discourse, let us first notice something. These Hegelian theories seem harshly critical of the Russellian paradigm of knowledge, of his distinction between “knowledge of things” and “knowledge of truths” about things, which corresponds to “knowledge of a thing by acquaintance” and knowledge of “propositions about it” (Russell 1912, 224–225). For Hegel, just as for Wittgenstein, it is senseless to consider knowledge of a thing outside a network of linguistic propositions. Russell bases his theory of knowledge by acquaintance on a very problematic conception of proper names; these have the property of immediately qualifying (denoting) a particular object (Russell 1905). Wittgenstein’s response: “Only the proposition has sense; only in the context of a proposition does a name have meaning” (Wittgenstein 1922, 55 §3.3), by which answer we are brought back to some of the early portions of *Phenomenology of Spirit*. In this way, propositions also stop being simple, formal, isolated propositions within the framework of a kind of logical Platonism; they become statements and utterances mediating other “propositions,” allowing our knowledge of the world to progress and enabling some form of auto-reflexivity, rather than of an infinite distinction of logical levels.

This reworking of the concept of experience makes it possible for us to understand what the sense and reach of mathematical knowledge is for Hegel. This point is important because it meets the Hegelian critique of the claim of formal logic grasping the truth, following the auto-reflexive challenge that emerged out of empiricist difficulties.

3. Mathematical knowledge

It will not be possible in this paper to examine the entire Hegelian critique of what he calls mathematical knowledge, nor its great interest for today’s epistemology of mathematics. I will concentrate instead on the new linguistic challenge that appeared in our first questions concerning empirical knowledge. For Hegel, this challenge makes the difference between mathematics and the logic that he wants to build: the first cannot answer

to it, but the second one can, and will ground the formal effectiveness of mathematics.

For Hegel, the undisputable merit of mathematical knowledge is that it breaks the initially impassable empirical subordination of knowledge. In mathematical discourse, reason gives itself its own rules, and progresses within the range of them. Mathematics is therefore an expression of the freedom of spirit, and is historically important as the first expression of metaphysics (with Pythagoras).

But if we remember the conditions which a logical framework of experience has to satisfy, Hegel can assert that mathematical knowledge is incomplete from the auto-reflexive perspective. In other words, we cannot, according to Hegel, mathematically justify the foundations of the mathematical knowledge. What does this mean? Hegel argues that mathematics certainly breaks with empiricism, but not completely with what Hegel calls the “given” (what could be called the “logical given” (Redding 2007: 58)). This logical given consists in numbers for arithmetic and pure space and axioms for geometry, things which these sciences receive as external material that cannot be deduced or proven from their own way of working, from their own rationality. In other words, the meta-mathematical knowledge that grounds mathematical knowledge is not itself mathematical, or at least always it is always incomplete or problematic, if we refer to Gödel’s later theorems. As a result, Hegel tries to ground mathematics on a new type of logic which breaks with any kind of “given,” including the pure intuition of Kant’s logical and mathematical philosophy. Here Hegel anticipates the logicist project of Frege in the *Grundlage der Arithmetik*, even if we deal here with a very different sort of logic.

But before going on with logic, let us notice one more side of Hegel’s philosophy of mathematics. Hegel argues that the mathematical knowledge is an incomplete discourse, and that such a lack of logical immanent foundation will drive mathematics to search for a justification of its success and relevance by resorting to empirical methods; it will be driven to search for an experimental and not a logical grounding, which at least partly denies the initial expectations of mathematics. We see here, in opposition to the above, how every (mathematical) formalism turns itself to an *empirio*-formalism. If we summarize the Hegelian texts, we discover three possible empiricist excesses of the mathematical sciences:

- 1) Mathematical empiricism or psychologism, as of John Stuart Mill. This naïve position is rapidly dismissed as contradicting the essence of mathematics: does a point, a negative or imaginary number, or non-Euclidian geometry have an empirical referent?
- 2) Mathematical intuitionism, which could be seen as characterizing the position of Kant, for whom the paradigm of mathematics is Euclidian geometry. According to Kant, mathematical representations are not the empirical world, but abstractions of it, the pure intuition where geometrical activity takes place. Such a theory is undermined by advances in mathematics, which saw a radical revolution between Kant and Hegel. For example, with Cauchy and infinitesimal calculus we can see a break in mathematics itself with the geometrical criteria of evidence and representation into intuition. Kant thought that problematic algebraic concepts like imaginary numbers were meaningless because they are impossible to represent. For Hegel, such a thesis is very problematic and means a refusal of mathematical formalism, and largely even logical discourse, as valid producers of knowledge.
- 3) What we could call “quantitative metaphysics.” This is what Hegel thinks he finds in Newton (for a global discussion, cf. Petry 1993). For him, the *Principia Mathematica* sounds like the deduction of the physical world in the second and third books from the *a priori* mathematical developments of the first book. According to Hegel, such an argument has three main faults.
 - a. A reduction of the physical truth to pure quantitative and formal conditions of mathematics (thus the physical world is deprived of a part of its richness; for example, Hegel argues that fundamental objects like time are not purely reducible to mathematical determinations).
 - b. A possible metaphysical excess that would postulate some purely mathematical entities as physically existing, as does Newton for autonomous forces, which are postulated on the basis of the vectors of vector geometry. This once again shows that the most interesting way of thinking about the link between discourse and reality is not

through direct resemblance, even in mathematics.

- c. This attempt bases itself on an unquestioned Galilean postulate: the immediate adequacy of mathematics and the physical universe. Once again, this is neither mathematical nor physical knowledge. Knowledge thus remains dependent on an external condition. This supposed immediate adequacy is revealed as problematic in light of the history of the sciences. This is very important for Hegel, but I will not insist on this point.

Let us say a few concluding words about mathematical knowledge. Hegel entreats that mathematical science not look for an empirical ground, but rather a logical one—which is what subsequent mathematics would actually do, enjoying the successes we know. But for Hegel, mathematics essentially fails to answer to the philosophical challenge of this auto-reflexive discourse that was required by the contradictions of empirical knowledge. Let us now briefly see how Hegel can attempt to establish it in his own *Science of Logic*, which claims at the same time to provide a place for both empirical and mathematical knowledge. We will better understand the Hegelian project through his critique of Kant, which is partly linked to his refusal of a mathematical/formal paradigm for logic.

4. Logical knowledge

A. Critique of Kant

Hegel denounces a pragmatic contradiction that takes place in Kant’s work. Once again, we face a philosophy unable to prove itself as relevant knowledge according to its own criteria. When the *Critique of Pure Reason* asserts that there is knowledge only through intuition and concepts, this assertion is not itself knowledge through intuition and concepts (what is Kantian *Esthetics* if not a *logic* of space and time, which does not itself take place through spatiotemporal intuition?). Hegel will keep in mind this dialectical contradiction, which is partly similar to the one for mathematical knowledge, and try to resolve it in his *Science of Logic*.

B. Speculative logic

It would take too long to cover the entire Hegelian logical project; I will concentrate on the problem discussed here. Hegel wants to accomplish the project that Kant wished to realize: the deduction of logical categories in their necessity and rationality

that would at the same time answer to the criterion of phenomenological experience. Hegel's logic has the task of showing the process that exists between immediate being and what he calls the concept (thinking). So, following the order of reason, the concept comes first, but it can only accomplish itself by negating being, first in the order of exposition, as *the* foundation of logic. So we consider here a *processual* logic, a logic which "returns to the foundation" as Hegel calls it, breaking with all absolute origins. This is how we have to understand the auto-reflexivity of Hegelian discourse, translated by an expressions such as "self-knowledge of concept," "the Idea knowing itself," etc. They can sound quite mystical, but in reality we encounter here very important epistemological problems.

I would argue that Hegelian processual logic is structured as a natural language, as a reflexive language, a language able to speak about itself. Thanks to its acceptance of a sort of semantic closure, its circularity is able to avoid falling into contradictions on the one hand, and triviality on the other, opening up the possibility—as Graham Priest shows it—of a para-consistent logic (Priest 1990), which is able to include the both the usual mathematical and logical categories. However, to take a stand in an old debate, I think this idea also shows the limits of all formalization of dialectical logic, which could correspond, in more contemporary terms, to the limit of the mathematization of meta-mathematical knowledge. For example, we know that some major formal theorems of Tarsky do not work within the framework of natural language precisely because of this semantic closure, which formalization eliminates (*cf.* Priest 1979, 1982).

Let me again say one thing before concluding. This logical knowledge is not only *a priori* in the Kantian sense; remember that we found in Hegel a self-criticism of empiricism rather than a Kant-like *a priori* exposition. Breaking with all formal paradigms of the "application" of logic to an external world, the relation between logic and experience is rather to be understood according to the process brought to light in the *Science of Logic* itself, without any absolute origin. As Fichte showed, the *a priori* or *a posteriori* character of a proposition does not depend on the nature of that proposition (for example, whether it is mathematical or empirical), but on the place of that proposition within the system of knowledge, according to the paradigm of reconstruction of the logical conditions

of empirical knowledge itself. So, if it is true that everything starts with empiricism, Hegel asserts clearly that it is also true that this is relativized and even denied as an immediate foundation of knowledge, going thus from the (empirical) order of things to the (logical) order of reasons. This is what Hegel calls "deduction," breaking with algebraic axiomatic demonstrations and geometrical intuitive constructions, as well as with the empiricist conception of knowledge as an immediate vision. For Hegel, "deduction is not the operation by which some knowledge is produced without any recourse to experience, and from abstract premises. Deducing consists rather in establishing a systematic link between different presupposed moments, no matter their origin" (Marmasse 2008, 220), by what we see that the categories of *a priori* and *a posteriori* are actually dialectized.

5. Conclusion

To conclude this paper, I will first question the status of philosophical or logical knowledge in Hegel's system, then discuss two points that seem particularly important in order for Hegel to have a fruitful reception in today's philosophy.

First of all, is philosophical knowledge a particular sort of knowledge which comes before others? Answering this question would imply a deep questioning of Hegelian concept of system. But let us answer simply. In fact, the answer could be: yes and no. "No" because philosophy does not produce any independent positive knowledge that could compete with other types of common or scientific knowledge, as is the case in Schelling's nature philosophy. Other types of scientific knowledge are respected within the framework of the Hegelian system, even if they are situated by philosophy and epistemology (on this topic, concerning natural sciences, including mathematics, *cf.* Cohen & Wartofsky 1984; Petry 1986, 1987; Moretto 1988). So, Hegel is a real post-metaphysical philosopher according to the Kantian definition of metaphysics. But we can see that, in another sense, the answer should be "yes," because philosophy is the only discourse able to ground itself, even if it is by the mediation of other sorts of scientific knowledge (and in this way it also depends upon empirical and mathematical developments), which makes up its particularity. In this specific epistemological and systematic way, philosophical logic can be seen as "formal" knowledge, in a new sense of the word "formal," systematizing what is only implicitly

present in the other types of knowledge. This also sheds light on the sense of Hegelian “monism.” Hegel’s aim is not to reduce the whole of knowledge to a unique logical principle (like the one of internal relations), but rather to situate each kind of knowledge in its right place, into a “system of levels,” as he calls it. So we can assert without great danger that on this point Russell did not at all understand the sense of the Hegelian systematic project (*cf.* Lejeune 2013).

I will now briefly return to contemporary analytic philosophers and mathematicians working within the Hegelian perspective I have tried to summarize here. Let us consider two important questions.

1) The relation between mathematics and logic.

Some contemporary American mathematicians like Alan Paterson and William Lawvere (Lawvere 1989, 1991, 1992, 1996; for a summary regarding the Lawvere-Hegel relation, *cf.* Mèlès 2012) find in Hegelian logic a possible way to ground a new mathematics—for example the class or categories theories—through what looked at first like the most anti-Hegelian developments in mathematics, and also avoid some problems brought to light by Gödel by accepting a kind of reflexivity. In this way, Paterson does not hesitate to “argue that Hegelian logic provides (in principle) this self-referential logic which is missing in Gödel’s account” (Paterson 2002: 3; about Gödel’s theorem, see also Priest 1987: 49-63). In contrast with some post-Leibnizian philosophers of mathematics (for example, Serres 1982), the others seem to take into account the Hegelian claim that meta-mathematical knowledge is itself not (entirely) possible to mathematize, for reasons I have already sketched above. Both have a very interesting task in helping to clarify some problems in today’s epistemology of mathematics. On the other hand, even if I think that such undertakings have essential limits from a Hegelian epistemological point of view, it can also be a challenge for formal/mathematical logic to express Hegelian logical categories thanks to its new tools, which of course Hegel could not have known about two centuries ago. This brings us to very interesting systems of logic, like the para-consistent or trans-consistent ones developed by Graham Priest (Priest 1987, 1990, 2006; about the relation of Priest’s dialetheism to Hegel’s dialectical logic, *cf.* Ficara 2013).

2) The relation between logical discourse and the empirical world.

Here we can refer to the work of philosophers like Robert Brandom (Brandom 1994, 2002, 2011) or John McDowell (McDowell 1996, 2003), breaking with some problems inherited from Frege, Russell, and Carnap. The linguistic world and the empirical one are not two universes existing immediately for themselves and separated from each other. The challenge here is the elaboration of a new semantics which acknowledges what Russell refuses to see: a proper name cannot make present a particular empirical object outside of the net of propositions which is always mediating or defining the name. Once again, the concept of para-consistence can help to resolve the very old—Platonic—question of what speaking means (Lejeune 2010).

To conclude, I can say that this rediscovery of Hegel brings to contemporary philosophy a number of particularly relevant questions, and it does so in a very revitalizing way. We can hope that the last barriers which led the analytic tradition to consider Hegel to be a crazy, outmoded, self-contradictory, or metaphysical philosopher will fall, so that his work can continue to provide new and important questions to contemporary thinkers.

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Book reviews

Alexandru Boboc, *Philosophy and Culture. Modern Revaluation and Reconstruction in Philosophy—from Nietzsche to Heidegger*, The Publishing House of the Romanian Academy, Bucharest, 2013, 242 pp

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The book of academician Alexandru Boboc¹ examines *in extenso* an exceptional period in the history of modern European philosophy: *from Nietzsche to Heidegger*. The main authors studied—Friedrich Nietzsche, Wilhelm Dilthey, Edmund Husserl, Max Scheler, Ernst Cassirer, Nicolai Hartmann, Hans-Georg Gadamer, Martin Heidegger—are almost unanimously recognized today as initiators and active participants in the reconstruction of contemporary philosophy and in the affirmation of a new self-consciousness of “European humanity,” and, by extension, of humanity in general.

Opening new and significant pages in the world’s “book of wisdom,” these great authors have redefined the “spirit of our times” (*der Zeitgeist*) through a *revaluation* of both existing and inherited values, as well as a *pluralization* and subsequent *reunification* of rational thinking perspectives on the whole human universe.

In what follows, I will try to present synthetically, according to my professional skills and interests, only a few key ideas extracted from the critical philosophical analysis of modern European civilization expressed by the philosophers analyzed in detail in this book.

Boboc’s analysis of the philosophical critique of modernity begins with Friedrich Nietzsche (1844–

1900), the philosopher of radical revaluation of human values. “In fact,” Al. Boboc notes, “the essence of his thinking lies more in the sphere of ethics and a criticism of the *philistine culture* from within the Germany of his time” (*italics added*).²

The main theme of his philosophy is the radical critique of all existing or inherited values for the purpose of some spiritual “liberation,” a human retrieval and “affirmation” of an authentic life. The “poet-philosopher” (*der Dichter-Philosoph*) himself said it in *Ecce Homo*: “Revaluation of all values (*Umwertung aller Werte*)—this is my formula for an act of the highest self-awareness (*Selbstbesinnung*) of humanity ...”³ And the general perspective of his revaluation is *nihilism*—the drastic conclusion that “the highest values are devaluated (*entwerten*),” culminating with Christianity, encapsulated in the famous phrase “God is dead” (*Gott ist tot*).⁴ “What I relate is the history of the next two centuries,” Nietzsche says in his prophetic style in *Der Wille zur Macht*. “I describe what is coming, what can no longer come differently: *the advent of nihilism*. ... For some time now, our whole European culture has been moving as toward a catastrophe, with a tortured tension that is growing from decade to decade:

² *Ibidem*, p. 11.

³ F. Nietzsche (2007) *Ecce Homo: How To Become What You Are*. Translated with an Introduction and Notes by Duncan Large. Oxford University Press, Oxford, p. 127.

⁴ F. Nietzsche (2006) *Thus Spoke Zarathustra: A Book for All and None*. Translated by Adrian del Caro, Cambridge University Press, Cambridge, p. 22.

¹ Alexandru Boboc (2013) *Filosofie și Cultură. Reevaluare și reconstrucție modernă în filosofie—de la Nietzsche la Heidegger*. Editura Academiei Române, București, 242 pp.

restlessly, violently, headlong, like a river that wants to reach the end..."⁵

Following the Heideggerian interpretation, Al. Boboc indicates here a new understanding of man. The *Gott ist tot* formula, the ultimate expression of Nietzschean nihilism, refers not only to the Christian understanding of God, but to "the supersensible world" in general, the domain of "ideas and ideals," understood through Plato until very late in the modern era. From here, Al. Boboc explains, some features of a new vision of modern man appear quite clearly, a vision which no longer contents itself with generalities about "mankind," but places the individual at its center. Nietzsche said it in the most categorical manner: "The individual is something quite new which creates new things, something absolute; all his acts are entirely his own. Ultimately, the individual derives the values of his acts from himself; because he has to interpret in a quite individual way even the words he has inherited."⁶

Therefore, the main Nietzschean themes—the death of God, the will to power, and even the Overman (*der Übermensch*)—become intelligible only together, in the sense that the entire understanding of religion and the traditional metaphysics of "the world from beyond" is beginning to be understood as a form of "self-estrangement"⁷ of man.

In contrast to well-known simplistic interpretations, the idea of the "Overman" maintains a high axiological sense. "Man is a rope stretched between the animal and the Overman—a rope over an abyss!"⁸ Nietzsche said in *Also sprach Zarathustra*, expressing a general anthropological vision that, after the meaning of his life died with God, modern man should give himself meaning, self-instituting into his own world, in "the world from here," through his will, activities, and valuable creations. "Nietzsche thus projected a conception of the world in terms of art, criticizing the traditional belief in an absolute 'truth' and in metaphysical thinking."⁹

When Nietzsche talks about the "death" of God, he does not mean the "nonexistence" of the "other-worldly" Being. Rather, Nietzsche is concerned with

the order we strive to impose on the world when we seek an ultimate meaning or some kind of all-encompassing totality, attempting to organize our world into a "teleological" comprehensive order. But the world in which we live, Nietzsche asserts, does not seem to be organized toward some ultimate goal. Successive projects to order the world in this way—in the guise of "Christianity" or "faith in progress" or "socialism"—inevitably fail. In the world we live in, no form is ultimate, since the diversity of forms cannot be reduced to a common denominator. The world around us is a world of constant change and irreducible diversity: "it is a world of *becoming*."¹⁰

Subsequently, to "revalue values" does not mean to replace one set of values (which negate life and are therefore nihilistic) with another (which affirm life). We do not replace "God" (after His "death") with something else (whether "man," "nature," or "life"). The revaluation of values is an attempt to justify them differently: values (the order of the world) must originate in life liberated from "nihilistic fictions": the "ultimate goal," the all-encompassing totality, the "truth-in-itself."¹¹

In the works of Wilhelm Dilthey (1833-1912), we find a reformulation in terms of "philosophy of life" (*Lebensphilosophie*), initiated by Nietzsche, and a "critique of historical reason," i.e. an examination of the fundamental problem of the human capacity to know himself and the society and history that he created. This knowledge is revealed not in isolated individual, but in historical man, for man is a "historical being" (*ein geschichtliches Wesen*). Therefore, human reason, never pure, is *historical*; its exercise is always dependent on the circumstances in which it is deployed, its principles being revised, improved, and complemented in the continuing historical and scientific process. Thus, with Dilthey, Al Boboc notes that the process of the "pluralization of Reason" becomes obvious in the forms shaped by the development of the modern sciences—forms of reason which are *historical* and especially *scientific*.¹²

This theme of the crucial importance of reason and its place in modern society will be reiterated and deepened by Edmund Husserl (1859–1938), the founder of phenomenology. In his article

⁵ F. Nietzsche (1968) *The Will to Power. A New Translation* by Walter Kaufmann and R. J. Hollingdale. Vintage Books, New York, p. 3.

⁶ *Ibidem*, p. 403.

⁷ Al. Boboc, *op. cit.*, p. 27.

⁸ F. Nietzsche, *Thus Spoke Zarathustra*, ed. cit., p. 24.

⁹ Al. Boboc, *op. cit.* p. 52.

¹⁰ Krzysztof Michalski (2013) *The Flame of Eternity: An Interpretation of Nietzsche's Thought*. Translated by Benjamin Paloff. Princeton University Press, Princeton, p. 4.

¹¹ *Ibidem*.

¹² *Ibidem*, p. 68.

“Phenomenology” for *Encyclopaedia Britannica* (1927), E. Husserl enunciates his phenomenological project to rebuild the transcendental “vault” of mankind, supported by ultimate, absolute norms and with an immanent, *teleological* structure, the whole phenomenological exercise being described as the “universal self-consciousness of mankind.”¹³

In “The Crisis of European Humanity and Philosophy” (*Die Krisis des europäischen Menschentums und die Philosophie*), the famous conference held in Vienna in 1935 and first published in 1953, Husserl develops the philosophical idea of “European humanity” and its historical origins, as well as causes of the “crisis” which it seemed to have entered in the twentieth century by losing (or denying) its *teleological* function of providing a regulative standard for “superior humanity,” something which Europe had historically done.

“European nations are sick; Europe itself, they say, is in critical condition,”¹⁴ Husserl noted in his conference. For individuals, there is a “natural medicine” available, as well as a “scientific medicine.” If the first is based on tradition and naïve empiricism, the second uses the science of the *human body* (anatomy and physiology) which, in turn, rests on the explanatory theoretical sciences of nature (physics and chemistry). *For human coexistence animated by purposes*, however, “how is it that in this connection there has never arisen a *medical science* concerned with nations and with international communities?” (*italics added*).¹⁵ The only treatments available were those of the empirical “natural medicine” flooding Europe as a deluge of naïve remedies proposed in the most exalted manner.

The eminent character of natural sciences consists in the fact that they are not content with an intuitive empiricism, but instead, starting from this, they systematically extracts its universal aspects, either as elements or laws. Based on laws, these sciences explain the concrete realities directly offered by intuition—be they people, animals, or celestial bodies—thereby achieving, together with

their modern technological applications, a true revolution in the “mastery of nature.” However, one of the most nefarious prejudices that contributes to the so-called “disease of Europe” denies even the *theoretical possibility* of a universal human science. The phenomenological project of “philosophy as rigorous science” is simply the achievement or reconstruction of such a science in order to discover the “unconditional universal” in historical man’s creative world. As Husserl argues, the man’s “world of life” (*Lebenswelt*)—the field of his permanent activities and anxieties—can and should be subjected to scientific examination, because it exists no less than objective nature, whose essential structures and natural laws are discovered by natural sciences.

Therefore, how do we characterize the “spiritual configuration” of the area called Europe? “Clearly, the title Europe designates the unity of a spiritual life and a creative activity—with all its aims, interests, cares and troubles, with its plans, its establishments, its institutions.”¹⁶ Despite their national diversity, Europeans live in the unity of a spiritual configuration, their material and spiritual creations possessing a unifying character. “It is a sort of fraternal relationship that gives us a consciousness of *being at home* (*einer Heimatlichkeit*) in this circle” (*italics added*).¹⁷

Spiritual Europe contains an immanent philosophical idea—its own *teleology*—to cultivate and nourish from the “infinite themes” of reason. Contrary to any (oxymoronic) “zoology of peoples,” spirituality or European humanity is not stopped by the natural phases of aging and death, but goes through the ages borne up by an inner “entelechy,” which has always guided it towards other forms of life. Its general *telos*, which is comprised of the particular *telos* of each nation and even of their individual members; “it lies in infinity; it is an infinite idea...”¹⁸

As a spirit, Europe was born in ancient the Greek culture of the eight to seven centuries B.C. There for the first time an exemplary attitude toward the surrounding world began to be cultivated, an attitude that foreshadowed a new cultural configuration which the Greeks called *philosophy*. Originally, philosophy meant “universal science, science of the entire world, the universal unity of all existence.” And as the whole is composed of its

¹³ “‘Phenomenology,’ Edmund Husserl’s Article for the *Encyclopaedia Britannica* (1927/1981).” In: Husserl, *Shorter Works*. Edited by Peter McCormick and Frederick Elliston, University of Notre Dame Press, Notre Dame, pp. 21–35.

¹⁴ E. Husserl (1965) “Philosophy and the Crisis of European Man.” Translated by Quentin Lauer. In: *Phenomenology and the Crisis of Philosophy*. Harper Torchbooks, New York, pp. 149–192.

¹⁵ *Ibidem*.

¹⁶ *Ibidem*.

¹⁷ *Ibidem*.

¹⁸ *Ibidem*.

parts, philosophy branched into various sciences studying different “regions” of existence. The origin of spiritual Europe lies in the emergence of a philosophy which sympathetically embraced all other sciences.

The debate was situated by Greek philosophical communities within a “horizon of infinity,” creating a “universal cultural spirit” and a new type of humanity which, although it lives in the finitude of its historicity, constantly aspires to infinity. The outcomes of earth culture and crafts, however valuable, have a *concrete* and *perishable* existence, while the acquisitions of certain knowledge are the opposite: *they are inexhaustible, durable, because they are abstract, ideal*. In the horizon of universal history, no other cultural configuration has sought, as has Europe, infinite “themes” or “tasks,” and subsequently achieved such “ideal acquisitions.”

As Al. Boboc rightly reveals, the insistent plea for the universal-human significance of science and reflection characterizes the entire Husserlian project of philosophical reconstruction. Apart from the idea of phenomenology as a “science of phenomena” (Kant), or as a theory of “spirit” development (Hegel), Husserl proposed a “return to beginnings” and to the “life world” (*Lebenswelt*), in order to reveal the essential significance both in *praxis* and *theorie* of major human achievements.¹⁹

Husserl himself summarized the significance of his philosophical perspective: “To get the concept of what is contra-essential in the present ‘crisis,’ the concept ‘Europe’ would have to be developed as the *historical teleology of infinite goals of reason*; it would have to be shown how the European ‘world’ was born from ideas of reason, *i.e.*, from the spirit of philosophy” (*italics added*).²⁰

With Ernst Cassirer (1874-1945), the Kantian criticism developed itself in the direction of a philosophy of culture as an autonomous discipline, making the “symbol” its fundamental concept. “No longer living in a merely physical universe, man lives in a symbolic universe. Language, myth, art, and religion are parts of this universe,” Cassirer programmatically says. Therefore, “[i]nstead of defining man as an *animal rationale*, you should define him as an *animal symbolicum*.”²¹

In *Vom Mythos des Staates*, posthumously published in 1946, Cassirer provides an explanation of the intellectual origins of the political totalitarianisms (Nazism and Communism) of his time, starting with political language functions. Our words have at least two functions—“semantic” and “magical.” As in archaic societies in which the *pronunciation* of certain words seemed to have some effect on natural phenomena (*e.g.* “calling the rain”), so in modern political discourse *magic often prevails over semantics*. The political leaders of totalitarian states have taken over all the functions that magicians hold in ‘primitive’ societies: they have become healers who promise to cure all social ills.

Certainly, magical beliefs are hard to counter with rational arguments: therein lies their strength. Therefore, Cassirer said, “[w]e should carefully study the origin, the structure, the methods, and the technique of political myths. We should see the adversary face to face in order to know how to combat him.”²²

Modern scientific activity and political activity indeed seem separated by an “abyss.” The first is the domain of methodical, rational thinking which extends continuously, while the latter is still influenced by mythical thinking proper to some primitive stages of human culture. Therefore, no matter how difficult it may be, “the power of myth” should be restricted by the strength of scientific and ethical arguments.

As Al. Boboc cogently argues, far from being a secondary or “occasional” work, *The Myth of the State* deciphered many profound meaning in dramatic political events of the first half of twentieth century, while providing a solid and comprehensive perspective for today.²³

In the works of Nicolai Hartmann (1882-1950), contemporary philosophy takes the form of a “critical ontology” of plural “regional ontologies,” recognizing again the viability of the Kantian view on the irreducible multiplicity of domains of existence. As Al. Boboc notes, Hartmann’s effort to develop the Kantian approach of “categorical” thinking into a “general theory of categories” is of exceptional significance for the advancement of science today.

Ontologically, the real world is understood through four “strata” or levels (*inorganic, organic, physical, and spiritual*), each of them with its own categories, but all beholden to some fundamental,

¹⁹ Al. Boboc, *op. cit.*, p. 70.

²⁰ E. Husserl, “Philosophy and the Crisis of European Man,” *ed. cit.*

²¹ E. Cassirer (1944) *An Essay on Man: An Introduction to a Philosophy of Human Culture*. Yale University Press, New Haven, p. 26.

²² E. Cassirer (1974) *The Myth of the State*. Yale University Press, New Haven and London, p. 296.

²³ Al. Boboc, *op. cit.*, p. 161.

general categories. These strata are overlapped, not juxtaposed, and they are necessary in a relationship of unilateral dependency, in the sense that the upper strata include many specific categories of the lower strata, but not *vice versa*. For example, the natural world (inorganic and organic strata) is subject to the lowest categories of Being, and so on.²⁴

As Al. Boboc explains, this “*Kategorialanalyse*” investigates the nature and scope of categories, first making necessary distinctions between the categories of science and conceptual thinking, then revealing specific categories for each domain of knowledge and existence.”²⁵ From this perspective, any monistic metaphysics is doomed to failure. From Plato and Aristotle, and continuing into the modern era with Descartes, Leibniz, Kant, and Hegel, the main domains of existence and knowledge are subject to their own different categories, *in principle* incomplete, always remaining to be discovered, always only incompletely enumerated—an inexhaustible “rhapsody,” as Kant once called it.

Beginning from the lower strata of being, the categories are presented as “opposing pairs,” such as substrate and relation, form and matter, unity and multiplicity, determination and dependence, agreement and conflict, element and assembly, etc., in a *categorial continuum* that still preserves the original unity. *If properly understood, the general idea of “universal connection of Being” does not transfer the specific categories of the upper strata (reason, conscious and purposive action, etc.) to the lower levels of material or organic existence.* This ontological and methodological principle is of utmost importance for the various current social sciences, which for reasons of analogical or metaphorical “expressiveness,” I believe, sometimes ignore the different levels of existence, *e.g.*, assigning the categories of inorganic or organic to the spiritual level, and *vice versa*. For reasons of space, the enormous difficulties and particularly pernicious misunderstandings created by these grave ontological and methodological confusions still present in some social sciences unfortunately cannot be discussed here.

In this sense, Hartmann rightly rejected as inappropriate both traditional teleologism (theological or metaphysical) and mechanistic and finalistic “scientific explanations” to the extent that

they disregard the different strata of existence. In terms of “regional ontologies,” for example, *finality* is an exclusive and irreducible category of human consciousness, of purposeful human action and thought, as opposed to *causality* as a specific category of natural events and processes. As Al. Boboc concludes through his general theory of categories, the author of “critical ontology” made significant contributions, impossible to ignore, which correspond to current scientific spirit.

Finally, in the works of Martin Heidegger (1889-1976), the “fundamental ontology” becomes preeminently a “philosophy of existence” (*Existenzphilosophie*), primarily concerned with human issues and human existence in the world, according to the principle that “not so much *existence* in general, but *human existence* is the paramount problem of philosophy” (*italics added*).²⁶ And “the meaning” of human existence is becoming central in this theoretical horizon. As Heidegger himself claims: “No age has exhibited its knowledge about man in such a penetrating and captivating way as it does contemporarily... But also, no age is less sure of what man is than the present one.”²⁷ In fact, as Boboc shows, Heidegger develops the great theme of freedom as the essence of truth, which is revealed by human works: “the essence of truth is freedom” (*das Wessen der Wahrheit ist die Freiheit*). Language reveals first how “to-be-in-the-world” (*In-der-Welt-sein*) as man; it unveils for himself and other people the world and his own *Dasein*. With some famous phrases, Heidegger expresses this idea in a suggestive manner: “Language is the house of being (*Die Sprache ist das Haus des Seins*). In its home human beings dwell. Those who think and those who create with words are the guardians of this home.”²⁸

Far from being only one tool among others in his possession, language is the possibility for man to situate himself in the midst of Being. “*Only where there is language is there a world*, that is, the constantly changing cycle of decision and work, of

²⁴ N. Hartmann (1949) *Philosophen-Lexikon*. Berlin, Walter de Gruyter.

²⁵ Al. Boboc, *op. cit.*, p. 170.

²⁶ Emmanuel Mounier (1946) *Introduction aux existentialismes*. Gallimard, Paris, p. 9.

²⁷ M. Heidegger (1973) *Kant und das Problem der Metaphysik*. 4 Aufl., Frankfurt, a. M., V. Klostermann, p. 203.

²⁸ M. Heidegger (1977) “Letter on ‘Humanism.’” In: *Basic Writings*. Translated by Frank A. Capuzzi. Harper & Row, New York, p. 239.

action and responsibility, but also of arbitrariness and turmoil, decay and confusion” (*italics added*).²⁹

But where there is spoken language, there is common or shared thinking which reveals the *dialogic* nature of man. And unity reached through dialogue is the ultimate foundation of human *Dasein*. “Since we have been a conversation and able to hear from one another,” Heidegger cites the poet Friedrich Hölderlin, and adds: “We—human beings—are a conversation... Speaking, then, mediates our coming to one another.”³⁰ As Al. Boboc concludes, the genuine mode “to-be-human” is common life in the world. Through his works, Heidegger exposes a real problematique of contemporary thinking centered around *the idea of man*, who seeks sense, autonomy, and authenticity.³¹

To conclude this brief exposition, I would like to return to the famous conference of E. Husserl, “The Crisis of European Humanity and Philosophy,” extensively analyzed in the book *Philosophy and Culture*. “The ‘crisis of human European existence’ (*des europäischen Daseins*), which manifests itself in countless symptoms of a corrupted life, is no obscure fate, no impenetrable destiny,”³² said Husserl in 1935, a severe diagnosis that still seems relevant today; but it resides in a certain “alienation” or “refusal” of multisecular rationalist cultural heritage in all major areas of our collective life. For Husserl, there were two possible outcomes to this situation: “the ruin of a Europe alienated from its rational sense of life, fallen into a barbaric hatred of spirit; or ... the rebirth of Europe from the spirit of philosophy, through a heroism of reason...”³³

Certainly the book *Philosophy and Culture* argues for the second option. Its enormous analytical effort is, after all, a warm and reasoned plea for “the rise of European man to self-awareness and consciousness of the value of a united Europe under the sign of reason and perennial values.”³⁴

We await Alexandru Boboc’s next book with great interest and intellectual curiosity. The ancient Greeks rightly said that such curiosity (*thaumazein*) is the beginning of all true philosophy.

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²⁹ M. Heidegger (2000) “Hölderlin and the essence of poetry.” In: *Elucidations of Hölderlin’s Poetry*. Translated by Keith Hoeller. Humanity, New York, p. 56.

³⁰ *Ibidem*.

³¹ Al. Boboc, *op. cit.*, p. 198.

³² E. Husserl, “Philosophy and the Crisis of European Man.” *ed. cit.*

³³ *Ibidem*.

³⁴ Al. Boboc, *op. cit.*, p. 100.

**Dimitri Ginev, *Practices and Possibilities*
(Würzburg: Königshausen & Neumann, 2013)**

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Just as in many other branches of philosophy, in philosophy of science we usually discriminate between “mainstream” (analytically-minded) and “continental” schools of thought. Dimitri Ginev is one of the few philosophers whose works clearly demonstrate that this established division is problematic; his works blend the argumentative rigor of the analytic variety with the conceptual richness of its continental counterpart. Moreover, bridging the gap between the two (more or less artificially constructed) camps, Ginev manages to make authors whose overall philosophical projects are clearly incommensurable (e.g., Brandom and Bourdieu) talk meaningfully to each other. As the infamous science wars clearly demonstrate, this is not a minor accomplishment. His last work, *Practices and Possibilities*, combines themes and theories discussed in some of his previous books. This thematic continuity is easily detectable, so I will not discuss the ties between his past and present views. It is also not my intention to provide a synopsis of the book to which the present review is devoted. On this occasion it seems sufficient to note that the book has an “open code”—the four chapters are relatively self-contained, and the reader can read them in whichever order best suits his own interests. On the other hand, some links are clearly present—the Introduction provides important clues for arguments elaborated later, Chapter 1 is largely historical, Chapter 2 more or less sets the stage for Chapter 3, and Chapter 4 can be read on its own.

What I would like to do in the present review is to say what the book is about (at least from my point of view), and provide critical comments on some of its most important claims and the argumentative links between them. Of course, my summary is doomed to be utterly idiosyncratic, since—as shall

become clear—in some important ways my views diverge significantly from the views of the author.

First of all, we should stress that *Practices and Possibilities* marks an important shift in the research agenda of Dimitri Ginev—from the hermeneutics of scientific research to the theory of practices. What he is trying to accomplish is to expose the “missing link” between “the being of meaning” and “the empirical reality of practices.” In his view, only the doctrine of ontological difference (construed “not as a dichotomy, but as an interplay between the ontic and the ontological”) is able to indicate how practices become meaningful (p. 7). So, the first thing we need to ask ourselves is: what is a practice?

According to Ginev, practices should not be viewed in line with the traditional account—hybrid entities which share the causal efficacy of the physical realm and the normative significance of the social realm (p. 12). We are urged by the author to embrace “hermeneutic realism,” which in this respect reduces to the claim that “the world always gets disclosed (as a reality of multiplicities of practices) in a hermeneutic situation of projection and appropriation of possibilities” (p. 29). What hermeneutic realism implies for the theory of practices is that “actors share a particular interrelatedness (nexus) of practices when they gain a collective understanding of themselves with regard to the possibilities they can (collectively) appropriate ... those who share interrelated practices have a collective mode of existence that is directed towards the possibilities projected by these practices” (p. 11). Now, as I understand this, “appropriating a possibility” should mean something completely orthogonal to “recognizing a possible move in a (language) game” (indeed, as we shall gradually see, Ginev develops his approach in

constant tension with Wittgenstein's philosophical legacy). Actors sharing a particular interrelatedness of practices are not playing an isolable language game which proceeds in accord with some system of rules, since "all normative statuses are outcomes of actualized possibilities, and all of them are fore-structured within horizons of possibilities" (p. 20). Now, is an external observer able to recognize that those actors have a shared mode of existence, if he has no direct access to their collective understanding of themselves? Is it possible for someone standing outside their world of possibilities to ascertain that he is confronted with a community to which he does not belong, and whose possibilities he is not fully appropriating? These questions become aggravated by the fact that Ginev is openly "discarding the view that practices are only individual habitualizations conditioning performances and emulations that make up social life," and hence rejects the "employment of objectivist criteria in identifying the existence of practices" (p. 109). So, should we view practices as aspects of the secluded life of a collective which unfolds quietly, completely concealed from the eyes of strangers?

In the Introduction, Ginev provides a pair of "definitions" of the key concept of practice—the first is a preliminary one and serves to show why "practices are not cultural patterns of social behavior," while the second is more developed, and its ramifications are fully traced in the last chapter. According to Definition I (which encapsulates the tenets of "trans-subjective existentialism"), "[a] tendency to project definite possibilities within a trans-subjective horizon of possibilities is a practice if the actualization of the appropriated possibilities leads to a temporal-spatial order of doings and sayings" (p. 15). So it occurs that "practices are collectively shared" by definition, since the processes of projection and appropriation of possibilities are prone to constitute "more or less sustainable collectives" whose genesis is effected by Dasein—"the ecstatic unity of subjectivity and trans-subjectivity" (p. 82). Now, it is completely natural that when we try to bridge the gap from Dasein to empirical collectives we might be interested in, we experience some difficulties. For example, on the basis of this definition, it is hard to pinpoint the exact scale on which we should locate such collectives. If several kids meet at the playground one sunny afternoon, and after playing for a while, some of them gain (or just feel that they have gained) a (limited) collective understanding of

themselves and the possibilities that are open for them and the kids they are playing with, do they all constitute a collective? What about the spectators of a soccer game, who are generally not deeply indulged into their reflexive self-understanding, and support different teams? If the possibilities they are appropriating have different "shades" (the possibility of winning for the supporters of the first team is a possibility of losing for the supporters of the rival team), can they be said to constitute a collective? Or are collectives much more enduring and self-conscious entities which unfold their existence on much larger time-scale and should be marked off from such purely episodic alliances? It is hard to answer this question, since the definition above is not introduced by means of motivating examples which expose the intuitive limits of its applicability. In general, a good definition is a definition which is at least in principle applicable to particular cases. In other words, a definition for X is something different from a criterion for X, but any definition of X should be compatible with the existence of criteria which allow us to recognize something as an instance of X. Just as with the second "definition" below, the first one does not readily suggest such criteria. How are we to ascertain that the perceived temporal-spatial order of doings and sayings is produced by means of some specific technique of projection and actualization of appropriated possibilities? If this question cannot be answered, or should even be considered nonsensical, then our understanding of collectives becomes too thin to support a genuine theory of practice.

Furthermore, the definition suggests that the "projection and appropriation of possibilities" should be viewed as open-ended, since, with regard to the members of a particular community, "the more possibilities they are appropriating, the more new configurations of practices are activated which are projecting new horizons of open possibilities" (p. 120). As far as science is concerned, this means that its products are subject to an ongoing process of reinterpretation, since "the entities and structures which are objectified and semantically codified remain within horizons of possible further reading" (pp. 52–53). This "further reading" cannot be blocked by means of well-known procedures like idealization, formalization, and deductive-nomological explanation, which Ginev renders as "typical practices of de-contextualization," since "[d]e-contextualization in scientific research is indistinguishably contextualized and fore-

structured” (p. 54). On this occasion I am tempted to add that procedures of formalization and deductive-nomological explanation can be viewed in a completely different way—as procedures of contextualization, since any formalization is relative to a formal language, and any deductive-nomological explanation is relative to an underlying logic (moreover, this way of looking at things would force us to the same conclusions as those presented above).

Another corollary of this thesis is that the scope of the open possibilities cannot be delineated in advance—just like practices, “possibilities do not have an autonomous existence independent of the acts of choosing them.” In other words, “[o]n the central tenet of trans-subjective (cognitive) existentialism, choosing possibilities for doing research (and articulating thereby a domain of scientific research) takes on the form of a hermeneutic circularity between the whole (an open horizon) and the particular (the act of actualization)” (pp. 121-122). Here I would completely agree with the author, since pondering about the domain of the possible in complete abstraction from the acts of choosing has led to the continued production of some really bad metaphysics.

A puzzling aspect of the first definition, which in my view should be elaborated in greater detail, concerns the derivative discrimination between “patterns” and “configurations.” Patterns are explicated as “*intrinsic* tendencies to choosing and collectively appropriating possibilities (within configurations of practices) that are amenable to being identified as stable structures by means of theoretical procedures” (p. 16). This is why “[s]tudying practices without admitting such objectifications allows one to see how changing configurations function by pre-cognitively and pre-normatively steering courses of choosing, appropriating, and actualizing possibilities” (p. 17). I should admit that it completely escapes me how we are to study practices without imposing such “derivable entities” on their amorphous multiplicity. Moreover, why should we render configurations of practices as completely different from patterns in this respect? Are there configurations over and above the process of their objectifying recognition as such? It is clear that some discrimination between two levels of description is operating here—we contrast “patterns” (which function on the level of theoretical objectification) and “configurations” (which function on the metaphysical level of

“worlds-of-possibilities”). In the same vein, we contrast (intrinsic) “tendencies” and “possibilities” (i.e. in the passage above, we shy away from talking about the possibility of “choosing and appropriating possibilities”). It seems that much greater attention and elucidation should be devoted to this finely stratified vocabulary if the reader is expected to explore its full potential.

Now we come to the second “definition,” which according to the author is an “epigraph” of the approach he is developing: “Practice is the *minimal (temporalized) site* within the world where the constellation of interpretative understanding, attunement (state-of-mind), and discourse takes place. ... Thus defined, practice can be conceived of as a unit. Yet it is not an *independent* and discrete *unit*. A particular practice is always circumscribed within a configuration of interrelated practices” (p. 17). This understanding clearly involves a circle (hopefully not vicious, but rather hermeneutic)—if we look for a practice, then we need to explore a configuration of practices, and if we examine a configuration of practices, then we need to get a hold on the practices which constitute it. The meaning of this definition and its relation to another crucial concern of the book (the notion of reflexivity) are explained below in the following way: “practices are inherently ‘accountable’ for their characteristic situation and the site in which their particular interrelatedness takes place. Therefore, the multiplicity of interrelated practices is distinguished by reflexivity. What becomes articulated within the multiplicity of practice is meaningful-reflexive reality” (p. 30). Identifying the meaning of the concept of reflexivity with the claim that “disclosing reality is a moment of the reality itself,” Ginev suggests that, on the one hand, sites are what gets disclosed in a “hermeneutic situation” and, on the other hand, they are what provides “access” to reality for their “inhabitants” by means of various fore-structures implemented in their practices (ibid). I admit that I am inclined to view “the world of possibilities” or “reality” in the good old-fashioned Kantian way—as regulative ideas which complement respectively the notions of “horizon” and “site,” although this seems precluded by the author, who has already noted that actors find themselves “within-the-world-of-possibilities.”

So-called “trans-subjective existentialism” is complemented by another doctrine which Ginev dubs “hermeneutic existentialism.” This is the claim that “knowledge guided by standards of objectivity,

truthfulness, conceptual simplicity, logical coherence, and so on always takes place in a world of interrelated practices that in their interrelatedness project possibilities for the constitution of meaning,” and subsequently that “[t]here is no theoretical world that is constituted outside of a horizon of possibilities projected by an interrelatedness of scientific practices,” which means that “the particular mode of being-in-a-scientific-world (say, the mode of existence of a scientific community) does not amount to being determined by a conceptual framework, since the latter is always situated within practices whose dynamics might revise it” (pp. 114–116). The last point is recognized by virtually all post-Kuhnian historiographers of science, which shows that this construal of science as a communal practice of cognitive assimilation of the theoretically-laden world is not specific for philosophical hermeneutics. What then is hermeneutic philosophy of science able to do for science?

According to Ginev, its methodological input is twofold. First, while respecting “science’s cognitive autonomy,” “[t]he critical task of the hermeneutic philosophy of science is to provoke scientists’ established sensitivity, thereby making them internal critics of the ways in which they articulate their own domain of research” (p. 129). If I get this right, then this means that hermeneutic philosophy strives to turn scientists into philosophers of science. Nevertheless, it rejects the typical by-products of this conversion, since its second task is to attack “the self-imposed epistemological identities that deviate from the interpretative nature of scientific practices”—scientism, objectivism, epistemic foundationalism, etc. (p. 108). I admit that I cannot see how this battle against “the false self-consciousness and ideology” of scientism is compatible with the recognition of “science’s cognitive autonomy.” Scientists’ conceptions concerning what science is about cannot be isolated from what they are doing, so we cannot criticize the first while leaving the second intact.

Now, let me substantiate a claim that I made in the outset. I mentioned that Ginev’s approach is developed in constant tension with Wittgenstein’s philosophical legacy. This tension is most easily detectable in his critique of Wittgenstein’s construal of rule-governed activity, which was later developed in the context of ethnomethodology. This construal is marked by three denials: (a) that rules are in need of interpretation; (b) that systems of rules can

gradually come into existence; (c) that it is possible to transgress a rule. Against Baker and Hacker’s reading of Wittgenstein, which is directly opposed to “interpretationism” (p. 97), Ginev propounds a hermeneutic construal of interpretation which renders this process as a ceaseless activity of mutual constitution of what is interpreted and its interpretation: “because the rule-following is located in a circularity of subjective choices and a trans-subjective horizon, it is necessarily an interpretative phenomenon” (p. 102). Furthermore, against ethnomethodologists’ lack of interest in the formation of rules, Ginev claims that the only way to overcome essentialism is to address the issue of the “genesis of normativity” (p. 73–74). Finally, against Wittgenstein’s neglect of the phenomenon of rule-transgression, Ginev states that “[r]ule-following and transgressing the following of rules are only palpable in the appropriation of possibilities,” i.e. in a hermeneutic framework (p. 91). Even though I am generally sympathetic to Wittgenstein’s approach, I would admit that some of these criticisms are justified. Indeed, according to Wittgenstein, you are not able to break a rule, since the fact that you do not observe it simply shows that you are not playing the particular game to which it pertains. For this very reason, it is meaningless to talk about the “genesis of normativity,” since the existence of systems of norms is an all-or-nothing affair. I am not completely happy with this, since it seems to clash with some of the intuitions underlying the way we talk about rules and systems of norms in general.

The last chapter of the book argues for the equiprimordiality of spatiality and temporality, *pace* Heidegger’s theory developed in his *Being and Time*. According to Ginev, “a theory of existential spatiality (as complementing a theory of existential temporality) is a part of (the ontology pertinent to) the hermeneutic theory of practices” (p. 28). What links the theory of “existential spatiality” to the discussion of the previous chapters is the fact that, according to Heidegger, the “production of closeness” should be attributed to “the trans-subjective totality of interrelated practices and contexts of equipment,” which is “irreducible to purely subjective behavior” (p. 136). A large portion of the chapter is devoted to the articulation of the many-faceted discrepancies between “existential spatiality” (with both of its aspects, “de-severance” and “directionality”) and its “objectifying thematization” by means of “mathematical projection.” According to Ginev, “[b]ecause

spatiality has a complexity of contexts and environments that does not display the characteristics of a dimensional space, the contextual place of a tool is not reducible to a position in a mathematical manifold of positions. By the same token, the nearness or remoteness of a tool in a particular environment cannot be equated with a distance, which is a purely geometrical notion applicable solely to metric spaces” (p. 137). But, although mathematical projection is “de-worlding” the entities to which it is applied, “there are no theoretical concepts devoid of existential genesis,” and thus “all concepts of space are (somehow) rooted in the circumspective concern of average everydayness as a primordial mode of being-in-the-world” (pp. 141–142). I am not competent to judge

whether this development of Heidegger’s ideas holds water or not, but I still believe that it is a step in the right direction, since all the talk surrounding Heidegger’s typically cryptic remark that “Science does not think” led to an unjustified neglect of the philosophically relevant content of his scientific / mathematical theories.

Let me finish this review with a brief recapitulation. *Practices and Possibilities* is an important book. Although some readers like myself may dislike the direction the author is driving toward, going through the meandering ways of the specific hermeneutic approach to the philosophy of science which Ginev has championed in the last several decades would be interesting and beneficial to all of them.

