

Two Theories of Levels of Reality

In Dialogue with Basarab Nicolescu

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1. Introduction

Not long ago I had a chance to contact Basarab Nicolescu. During the past few years we have both been engaged in developing what we call the theory of levels of reality, without really knowing what the other was doing. To the best of my knowledge, this is the first time that the two theories have been explicitly compared. Indeed, open discussion of the pros and cons of the two proposals may prove beneficial to both of them because it may help clarify their presuppositions, provide clearer presentations of their results and eventually pave the way to new problems worth addressing. Both theories have a number of theses in common (e.g. the difference between levels of reality and levels of organization; see M: 22 and S) as well as putting forward remarkably different claims. Clear recognition of their similarities and differences, and frank discussion especially of the latter, may therefore contribute to the development of a conclusively more robust theory of levels of reality.

Before beginning the said critical comparison, I would point out that both Nicolescu and myself have defended the importance of the organic nature of reality, albeit in markedly different ways. Nicolescu openly relies on the tenets of *Naturphilosophie* and in particular on the vision advocated by Jacob Böhme and set out in his award-winning book on Böhme (see B). As a consequence, “an attempt to elaborate a new philosophy of Nature” comes to be seen as “a privileged mediator of a dialogue among all the areas of knowledge”, which amounts to saying that the elaboration of a new philosophy of nature “is one of the highest priorities of transdisciplinarity” (M: 65).

As far as my own proposal is concerned, my theory of levels of reality is a component of a more classically oriented idea of dynamic ontology. Aristotle and Leibniz are two of the great philosophers of the past who sought to develop a categorical system of dynamic nature. Closer to our times are the endeavors of Brentano, Husserl and Hartmann in Europe and of Peirce and Whitehead in the United States. By standing on their shoulders, we will perhaps be able to see a little bit further. Even if the two proposals proceed along different routes, in principle they are not orthogonal to each another.

Another thesis shared by both of us is that “reality is structured via a certain number of levels” (M: 49). Unfortunately, however, I see no reason to accept the subsequent claim “for the sake of clarity, let us suppose that this number is infinite” (M: 50). I, for one, do not see any robust reason in favour of the demanding claim that there should be an infinite number of levels of reality, and, in any case, an explicit argument in support of it should be provided. Interestingly, the claim of an infinite number of levels of reality seems to run counter to other aspects of the theory defended by Nicolescu. If we consider that the only levels of reality explicitly mentioned by Nicolescu are the quantum and the macro physical world (see below), the idea of an infinite number of levels is at odds with the distinction itself between levels of reality and levels of organization.

According to Nicolescu, transdisciplinarity is based on three pillars: levels of reality, the logic of the included middle, and complexity. I myself accept a version of the theory of levels of reality, whilst I reject the logic of the included middle; and from what I have been able to understand, my view of complexity is rather different from Nicolescu's. This may also be the most appropriate place to admit that I am unable to understand some of the subtleties of Nicolescu's theory of transdisciplinarity: for instance, its claims that "the place of transdisciplinarity is a place without place" (M: 117) or its systematic use of twin expressions such as "immanent transcendence" vs "transcendent immanence" (M: 128). Being unable to grasp the intended meaning of these expressions, I shall omit their analysis.

This paper focuses on Nicolescu's theory and relies on his *Manifesto of Transdisciplinarity* (M). In order not to interrupt the flow of the argumentation, I have summarized some of the main theses of my own theory of the levels of reality in Annex A at the end of paper.

This paper is organized as follows. Section 1 is this Introduction; Section 2 briefly describes the main starting points of the two theories of the levels of reality I am about to compare; Section 3 discusses the logic of the included middle; Section 4 rapidly addresses the problem of complexity; Section 5 introduces levels of perception and asks whether it would not be better to include also psychological phenomena within the theory of levels of reality; Section 6 discusses the problem of the laws characterizing levels of reality; Section 7 calls attention to the danger of an unrestricted use of the concept of level; Section 8 discusses the issue of the multireferentiality of the theory of levels; Section 9 provides an overall synopsis of the paper by listing some of the basic questions about levels of reality and collecting the different answers provided by the two theories; finally, Annex A summarizes the main theses of my own theory of levels.

2. The Respective Backgrounds of the Two Theories of Levels of Reality

By way of introduction to the two different theories of levels of reality developed by Nicolescu and myself, it is helpful to state their respective backgrounds. As already mentioned, Nicolescu considers the theory of levels of reality to be one of the three requisite components of a new vision called 'transdisciplinarity'. The other two requisite components of transdisciplinarity, besides the theory of levels of reality, are the logic of the third included and complexity, which I shall respectively discuss in sections 3 and 4 below.

Transdisciplinarity today comes in different guises, as a simple search on the web will prove. Here I shall consider only the view of transdisciplinarity elaborated by Nicolescu. The first step towards understanding transdisciplinarity is to distinguish transdisciplinarity sharply from both multi- and inter-disciplinarity. According to Nicolescu, multidisciplinary studies a topic from several different disciplines at once (M: 42), whilst interdisciplinarity addresses the problem of transferring a method from one to another discipline (M: 43). On the other hand, transdisciplinarity is mainly interested in "the understanding of the present world, of which one of the imperatives is the unity of knowledge" (M: 44). It is precisely this goal of the unity of knowledge that obliges one to consider "that which is at once between the disciplines, across the different disciplines, and beyond all disciplines" (M: 44).

One might perhaps add that the task of transdisciplinarity is to bring to light, to make visible, the usually hidden links among the various disciplines.

In this respect, it is important to acknowledge that "disciplinary research concerns, at most, one and the same level of reality" (M: 44-45). Ever more precisely, "in most cases, it (= disciplinarity) only concerns fragments of one level of reality" (M: 45). I can only add that I entirely agree with the latter two quotations. Furthermore, "transdisciplinarity concerns the dynamics engendered by the action of several levels of reality at once" (M: 45). Again, I totally agree.

The only difference worth noting is that I understand “the dynamics engendered by the action of several levels of reality at once” to be the core subject of ontology. This is a first interesting outcome: what Nicolescu takes to be one of the defining features of transdisciplinarity corresponds to what I take to be one of the defining features of ontology. Perhaps a not entirely obvious outcome.

Nicolescu himself partly admits that his theory has also an ontological bent: “the meaning we give to the word *reality* is pragmatic and ontological at the same time” (M: 20). Although I am unclear as to the connections between the pragmatic aspects and the ontological ones, I am happy enough with this at least partial acknowledgment of the ontological side of transdisciplinarity.

Given this first, possibly unexpected, result, interest grows in what in the end constitutes a level of reality. As before, a quote may suffice: “by ‘level of reality’ we intend to designate an ensemble of systems that are invariant under certain laws”. Which amounts to saying “that two levels of reality are different if, while passing from the one to the other, there is a break in the laws and a break in fundamental concepts (such as, for example causality)” (M: 21). I could not express my own ideas any better.

Before I add some of the necessary details, it will be helpful briefly to return to the problem of the unity of knowledge. Philosophy has long shown that there are two main routes to achieving the unity of knowledge: the various kinds of knowledge may be unified because their object is one or because their method is one. The former route presupposes that the world (universe) is one; each kind of knowledge (each discipline) may consider only some aspects of the world (such as the world’s material constitution), or some of its entities or parts (such as the living entities populating the world). The unity of the world is the ground for the unity of knowledge about the world. This view is essentially ascribable to Aristotle and can be termed the ontological understanding of the unity of knowledge. The opposite view is the epistemological one initially developed by Descartes. This second perspective starts from the thesis that all the forms of knowledge that we are able to develop are always *our* forms of knowledge. If we want to rely on knowledge that is as certain and evident as possible, our only option is to check and assure the internal consistency of our theories. However important consistency may be, it is nevertheless a feature internal to theories. Much more relevant is whether a theory is able to grasp, even to a limited extent, some aspects of reality.

As far as I can tell, scientists of whatever bent do their best to know how the reality of interest to them actually works, be it microphysical particles, the Na-K pump within cell membranes, the onset of depression, or the divorce rate in wealthy countries. I have deliberately provided radically different examples from sciences as diverse as physics, biochemistry, psychology and sociology. In short: all the sciences have a basic ontological orientation and it is therefore legitimate to claim that for them the ontological side prevails over the epistemological one. This is precisely the starting point of the theory of levels of reality that I have been developing for more than ten years.

The situation at hand is the radical opposition between the fact that the world (= reality) is one, and the fact that we seemingly need an ever-growing number of disciplines, sub-disciplines and technologies to understand the many sides of this same world. Since we do not have anything like a “science of the sciences”, ontology seems the only categorical framework within which we can address the problem of synthesising the multiplicity of accounts provided by the complex array of disciplines and technologies.

As far as I can tell, the theory of levels of reality is precisely the general framework able to provide the categorical tools with which to distinguish and coordinate the various disciplinary and technological outcomes. Some categories will be universal, i.e. valid for all kinds of reality, whilst others will be domain or local categories, i.e. valid only for some kinds or modes of reality.

The theory of levels of reality should encompass each and every science: not only the natural sciences – something that can be taken as obvious – but also the cognitive and social sciences. In other words, “reality” does not mean “physical” reality, for also psychological and social phenomena are real (on occasion dramatically so).

For me, all the sciences have a basic ontological orientation. They seek to understand the world and our experience of it. Ontology, as an autonomous discipline, studies the links among results obtained by the various sciences. The problem is that the pictures yielded by the different sciences are categorically different, and no conceptual framework able to synthesise them properly is available. Consequently, an adequate ontological framework has still to be elaborated.

Ontology needs the achievements of all the sciences if it is to accomplish its aims. Even if we accept the Philosopher's claim that, by virtue of the problems it addresses, ontology is *philosophia prima* (first philosophy), then because of the answers it proposes, ontology can be only *philosophia ultima* (last philosophy). In between there lies science.

On the other hand, Nicolescu seems to start from the more restricted thesis that "reality" should only be understood as "physical" or "material". Not by chance, then, only two main levels of reality are explicitly mentioned by the *Manifesto of Transdisciplinarity*: one corresponding to quantum physics and one roughly corresponding to classical physics, and namely: "the quantum level, which is a level of reality different from the macrophysical level" (M: 25). These two levels can be taken as showing that the micro structure of the world obeys laws very different from those valid for the mesoscopic structure of the world, such as global vs. local causality (or nonseparability vs. separability). Whilst I obviously agree with the claim that the ontological nature of the quantum world is different from the nature of the macrophysical world, I would further claim that organisms, minds and societies – in their own way different from those characterizing physical entities – instantiate authentically different levels of reality.

If I have understood Nicolescu correctly, his theory firmly distinguishes levels of reality from levels of perception. Strictly speaking, for him levels of perception are not levels of reality. Yet I do not understand why physics alone should be deemed real. For me, also perceptions and cognitions are real, albeit in a way different from that in which physical entities are real (and we know that the latter can be real in at least two different ways: the quantum and the macro). Furthermore, also social phenomena have their own family of levels.

Before turning to a more detailed analysis of these issues, I must address the problems of the logic of the included middle and complexity, the two other pillars of transdisciplinarity.

3. The Logic of the Included Middle

While Nicolescu's analysis of physical levels is crystal-clear and arises from thorough acquaintance with the current understanding of physics, his references to logic and logical frameworks starts from a perspective very distant from the contemporary understanding of logic. This raises a serious problem: whilst I fully accept the claim that our understanding of logic may still be limited, and that many surprises may be in store, we nevertheless have a *prima facie* obligation to rely on what we have so far understood and the results obtained. Those wishing to propose an alternative formal framework have the substantial obligation to provide compelling arguments in favour of their alternative proposal. If they fail to do so, they are not in a position reasonably to ask other scholars to accept their proposal. To date the logic of the included middle has been entirely at odds with contemporary logics: properly speaking the logic of the included middle cannot be called a logic at all. Its structure is underspecified, no formal derivation rule has been established, no theorem derived, no metatheory developed. In short, none of the criteria for legitimately speaking of a *logic* has been fulfilled. It may well be that all these developments will come about in due time. However, to date the requirements for considering the logic of the included middle a real logic have not been met. This has an immediate consequence: if the logic of the third included cannot be seriously considered a real logic, the idea of grounding transdisciplinarity on it radically undermines the viability of the idea itself of transdisciplinarity.

In this regard, the second article of the *Charter of Transdisciplinarity* warrants brief discussion. The article runs as follows: “The recognition of the existence of different levels of reality governed by different types of logic is inherent in the transdisciplinary attitude. Any attempt to reduce reality to a single level governed by a single form of logic does not lie within the scope of transdisciplinarity” (M: 148). I unreservedly accept the idea that an array of different logics may be needed to model different levels of reality. However, I am unsure as to the exact meaning of the qualification “types” of logics. To what does the article refer? To the difference between, say, propositional and predicative logics? Or to the need to use, say, temporal or modal logics? I, for one, am confused by the reference to “types” of logic. Something more important, however, is implicit in the article: on taking it for granted that different levels of reality may need different logics, the most relevant question becomes: how are the various levels of reality tied to each other? What connections link the various levels? What logics, if any, should be adopted to model these ties? Is there any single logic connecting the various levels, or should we resort to a number of different logics according to the case? Interestingly, the *Manifesto of Transdisciplinarity* forcefully defends the claim that one single logic, namely the logic of the third included, should be used to articulate the links between levels. Moreover, the connection between levels of reality and levels of perception must also adopt the logic of the third included. On the other hand, the *Charter of Transdisciplinarity* is significantly silent on the links between levels. Perhaps not even those who have endorsed the *Charter of Transdisciplinarity* are entirely sure about the logic of the included middle.

What I find difficult to understand is the tension between the claim that the *only* logic linking the different strata of reality is the logic of the included middle and the author’s candid admission that “no one has succeeded in finding a mathematical formalism that permits the difficult passage from one world to another” (M: 21). I presume that I can read “level” for “world”. I am entirely in favour of the latter claim (and obviously thoroughly against the former one). Within my own framework, in fact, I have never sought to specify the logic linking the various levels to each other. Since the various strata of reality are so categorically different, I see no real problem in humbly admitting that there may be no logic between them. It may well be that the very idea of an inter-strata logic should be rejected.

4. Complexity

Complexity is the third pillar of transdisciplinarity. Unfortunately, the analysis of complexity provided by the *Manifesto* is cursory and unspecific. To make matters worse, the claim is advanced that “the logic of the included middle is perhaps the privileged logic of complexity” (M: 30). The further remark that “privileged” should be understood “in the sense that it allows us to cross the different areas of knowledge in a coherent way” is not much help. Since I do not know of any specific treatment of complexity conducted from the point of view of this theory of transdisciplinarity, I am not in the position to add more specific observations.

5. Levels of Perception or the Psychological Stratum?

According to Nicolescu, “the different levels of reality are accessible to human knowledge thanks to the existence of different levels of perception, which are found in a one-to-one correspondence with levels of reality” (M: 55). This quote marks the point of maximum difference between our two theories. To abbreviate the many questions that can be raised, the issue is why psychology (or cognitive science) is not seriously taken into consideration. In so far as we are interested in the physical world, we all assume without further ado that we must pay all the necessary attention to

physics and its results. Similarly, if we are interested in perception or any other psychological phenomenon, the first step is to pay all the necessary attention to psychology and its findings. I accept that ontology may eventually reach the conclusion that some scientific data are not entirely reliable and may need deeper consideration. However, this will be the outcome of profound and highly precise analysis and cannot be assumed *a priori*. Now, if there is something that psychology has supported with an astonishing range and amount of experimental data is that the perceptual connection with the external world is far from being one-to-one.

As regards physics, no-one can seriously speak today about physics without acknowledging quantum phenomena. Likewise any serious discourse on perception cannot but acknowledge that it has its own internal laws and the connection with the perceived world is many-to-many.

However, even if the admittedly too restrictive one-to-one claim is amended, the problem remains as to whether perception should or should not be taken as an autonomous level of reality. My answer is that psychological phenomena form a specific level of reality, and perception should be considered a specific sub-level within the psychological level.

6. The Laws of the Levels

As already said, in most cases the exact connecting links between levels of reality are still unknown, or only partially known. This serious lack of knowledge notwithstanding, we are nevertheless able to specify some of their most general properties. The *Manifesto of Transdisciplinarity* mentions three theses formulated by the physicist Walter Thirring (M: 63). Let me repeat them in some detail:

1. The laws of any inferior level are not completely determined by the laws of a superior level ... That which is considered to be fundamental on one level may appear accidental on a superior level, and that which is considered to be accidental or incomprehensible on a certain level can appear to be fundamental on a superior level.
2. The laws of any inferior level depend more on the circumstances of their emergence than do the laws of a superior level. The laws of a certain level depend essentially on the local configuration to which these laws refer. ... certain internal ambiguities concerning laws of an inferior level of reality are resolved by taking into account the laws of a superior level.
3. The hierarchy of laws evolved at the same time as the universe itself. In other words, the birth of laws occurs simultaneously with the evolution of the universe. These laws pre-exist at the 'beginning' of the universe as potentialities. It is the evolution of the universe that actualizes these laws and their hierarchy.

I have no principled difficulty in accepting these three laws. Since each of them comprises a number of different aspects, these should be distinguished. The second law, for instance, seems to include the idea that all the categories of a particular level of reality perform their determining function jointly. This is indeed a profound intuition, explicitly presented by Nicolai Hartmann, one of the greatest figures in the field of the theories of levels of reality (see Hartmann 1952, p. 65). An immediate consequence of the solidarity linking together the categories determining a level of reality is that categories occurring in diverse levels have at least partially different meanings because they interact with different sets of categories.

As a matter of fact, Hartmann's laws of dependence and independence between levels go deeper than Thirring's into the details of inter-levels connections. Let me copy the relevant passages from my "The Basic Problem of the Theory of Levels of Reality", pp. 274-275. Given that the difference between strata and layers has not yet been introduced, I shall continue to use 'level' generically (and modify the text accordingly):

The following are the laws of dependence:

1. Every level comprises categories of the lower level, but in no case do the categories of a higher level appear in a lower one. The assumption of categories from one level to another can only operate upwards, never downwards.
2. This reappearance of the categories is always limited. It does not occur as regards all the categories of the lower level, nor does it extend to all the higher levels.
3. The categories passed from lower to higher levels undergo change. They are transformed by the character of the higher level. What persists unchanged is always only a fundamental categorical aspect.
4. The reappearance of lower categories never constitutes the character of the higher level. This always stems from the intervention of a categorical 'novelty' which is independent of the lower categories and consists in the emergence of new categories. The change occurring in the elements that reappear is brought about by the introduction of this 'novelty' (H, 75-6).

The first three laws of autonomy are as follows:

1. The fundamental categories encompass all the various ontological levels. However, they display features at every level which are specific to that particular level (because they interact with the complex of categories at that level).
2. The categories of the lower ontological levels are the foundation for the higher ones, but they are indifferent to the higher categories.
3. The categories of the lower levels are stronger than the categories of the higher levels, but they have lesser structural power.

From the above laws, the consequence can be immediately derived that "no level of reality constitutes a privileged place from which one is able to understand all the other levels of reality" (M: 54-55). On the other hand, neither Hartmann's nor Thirring's laws implies that "a level of reality is what it is because all the other levels exist at the same time" (M: 55). I do not think that physics, say, became in any way different when life began or when the first society emerged. Lower levels, Hartmann claims, are indifferent to higher levels.

7. Levels Everywhere

According to Nicolescu, transdisciplinarity is a thoroughly levelled framework and includes not only levels of reality, but also levels of perception, levels of understanding, levels of confusion and levels of silence. According to the canons of transdisciplinarity, it is very likely that my theory of levels suffers from a very high level of confusion, perhaps the maximal one. Be that as it may, one would nevertheless ask whether all these levels are of the same kind, i.e. whether they obey the same structural rules. As far as levels of reality are concerned, we have seen that the idea itself of level is grounded on "systems that are invariant under certain laws". More precisely, "two levels of reality are different if, while passing from the one to the other, there is break in the laws and a break in fundamental concepts" (M: 21). In short, my interpretation of the last two quotes is that two levels are different if they require a different set of ontological categories. Would it be correct to extend this understanding of level of reality to the other types of levels too? Possibly not. The trouble is that left underspecified is the intended meaning of the many other types of level mentioned by the *Manifesto*. Levels of confusion, for instance, are defined as a "lack of respect for the unique and singular role that each level of reality and each level of perception plays within the open unity of the world" (M: 111). However, I cannot say that this definition is a great deal of help;

nor of much help is the subsequent listing of the main types of confusion (i.e. “forgetting the discontinuity of levels of reality and levels of perception, replacing them implicitly with continuity” (M: 111), assuming one level of reality and many levels of perception (M: 112), assuming many levels of reality and one level of perception (M: 113)).

8. The Multireferentiality of the Theory of Levels

Multireferentiality is one of the main claims of the theory of levels, and both Nicolescu and myself openly defend it.

A few quotations may suffice: “The discontinuity that is manifested in the quantum world is also manifested in the structure of the levels of Reality. That does not prevent the two worlds from coexisting. The proof: our own existence. Our bodies contain simultaneously a macrophysical structure and a quantum structure” (M: 21). This is entirely correct. I would only add that our bodies contain also a biological structure, which is something very different from both their micro- and macro-physical bases. Furthermore, our bodies are the grounds for utterly different phenomena, such as the minds we happen to have and the many widely articulated social roles we perform.

9. By Way of Summary

The following table summarizes some of the paper’s main outcomes

| | Question | Answer | |
|---|--|--|--|
| | | Nicolescu | Poli |
| 1 | What is a level of reality? | An ensemble of systems that are invariant under certain laws | The referents of a coordinated group of ontological categories |
| 2 | What distinguishes levels of reality? | Laws, concepts | Categories |
| 3 | Are levels of reality discrete or continuous | Continuous | Discrete |
| 4 | Are levels of reality all of the same kind or are there different types of levels? | Same type | Different types |

The answers to 1 and 2 are almost equivalent, whilst the answers to 3 and 4 are patently different. Annex A will spell out some of the differences in some detail. As regards the theory of levels of reality, the main difference between Nicolescu’s and my own theory concerns whether psychological phenomena should be taken as forming a specific level of reality. According to Nicolescu, the answer is no, because psychological phenomena pertain to levels of perception. Yet I do not see why psychological phenomena should not be considered a specific level of reality. A further difference is that Nicolescu’s theory does not seem to have room for social phenomena, whilst mine sees them as constituting another level of reality, different from, but not unrelated to, the material and the psychological levels.

10. Annex A

It is fair to claim that no general consensus exists on how to define, describe or even sketch the idea of level of reality. This Annex A presents a fragment from my “Ontology: The Categorical Stance”. As far as my own framework is concerned, it adopts a *categorical* criterion: the levels of reality are characterized (and therefore distinguished) by their categories. The main subsequent distinction is between universal categories (those that pertain to reality in its entirety) and categories that pertain solely to one or some levels of reality.

Most authors prefer instead to adopt an objectual standpoint, rather than a categorical one. Arguing in favor of the objectual standpoint has the undoubted advantage that it yields an elementary definition of level: a level consists of a collection of units. From this point of view, the series of levels is a series of objects interacting at different degrees of granularity. A model of this kind is accepted by large part of the scientific community, because it depicts the widely held view of levels based on a reductionist approach. Higher-order groups of items may behave differently, even to the point that it is impossible to calculate (predict) their specific behaviour, but in the end what matters is that they can all be reduced to the lower *atoms*.

If this were indeed the way matters stand, then the general neglect shown towards the problem of the levels would be justified.

In order to deal with the real complexity of the problem of the levels, the general picture must be altered so that it becomes possible to study not only *linear* hierarchies but *tangled* ones as well. This conclusion bears out the approach which undertakes categorical analysis, compared to the one which studies items in iteration.

An argument in favor of the approach *by objects* is the ease with which it is possible to pass from a object-based description to a process-based one: if a level is defined by items in iteration (where the items can be canonically conceived as objects), then a level can be characterized by a dynamic. A multiplicity of structurally stable dynamics, at diverse levels of granularity, may articulate a multiplicity of levels. However, if it turns out that the structuring in levels does not respect a universal principle of linearity, then one is forced to restrict the multidynamic frames to their linear fragments. Which is precisely the situation of current theories of dynamic systems. On careful consideration, in fact, the predominant opinion is that there is only one multi-dynamic (multi-layered) system: the one described by the natural sciences. Other forms of knowledge are scientific to the extent that they can be located in the progressive series of supraformations (groups of groups of groups of items, each with its specific kinds of interaction). Hence the alternative: a discipline is scientific to the extent that it can be located in the series of aggregation levels – if so, it can be more or less easily reduced to the base level – or it cannot be thus located and is consequently not a science: it has no citizenship in the realm of knowledge and is scientifically stateless.

The distinction is widespread among three basic realms or regions (or strata, as I will call them) of reality. Even if the boundaries between them are differently placed, the distinction among the three realms of material, psychological and social phenomena is essentially accepted by most thinkers and scientists. A major source of discussion is whether inanimate and animate beings should be placed in two different realms (this meaning that there are in fact four and not three realms) or within the same realm. The latter option defends the thesis that a phase transition or something similar connects inanimate and animate items.

From a categorical point of view, the problem of how many strata there are can be easily solved. Leaving apart universal categories (those that apply everywhere), two main categorical situations can be distinguished: (a) Types (Items) A and B are categorically different because the description (codification or modeling) of one of them requires categories that are not needed by the description (codification or modeling) of the other; (b) Types (Items) A and B are categorically different because their description (codification or modeling) requires two entirely different groups of categories. Following Hartmann, I term the two relations respectively as relations of over-forming

(*Überformung*) and building-above (*Überbauung*).¹ Strata or realms of reality are connected by building-above relations. That is to say, the main reason for distinguishing as clearly as possible the different strata of reality is that any of them is characterized by the birth of a *new* categorical *series*. The group of categories that are needed to analyze the phenomena of the psychological stratum is essentially different from the group of categories needed to analyze the social one, which in its turn requires a group of categories different from the one needed to analyze the material stratum of reality.

Over-forming (the type (a) form of categorical dependence) is weaker than building-above, and it is used to analyze the internal organization of strata. Each of the three strata of reality has its specific structure. The case of the material stratum is the best known and the least problematic. Suffice it to consider the series atom-molecule-cell-organism (which can be extended at each of its two extremes to include sub-atomic particles and ecological communities, and also internally, as needed). In this case we have a clear example of a series that for the most part proceeds by levels of granularity. Compared to the material realm, the psychological and social ones are characterized by an interruption in the material categorical series and by the onset of new ones (relative to the psychological and social items). More complex types of over-forming are instantiated by them. A terminological note may be helpful. I use the term “level” to refer in general to the levels of reality, restricting the term “layer” to over-forming relationships, and the term “stratum” to building-above relationships. I shall eventually use the expressions “sub-layer” and “sub-stratum” when analysis requires them.

The question now arises as to how the material, psychological and social strata are connected together. The most obvious answer is that they have a linear structure like the one illustrated by the left side of Figure 1.

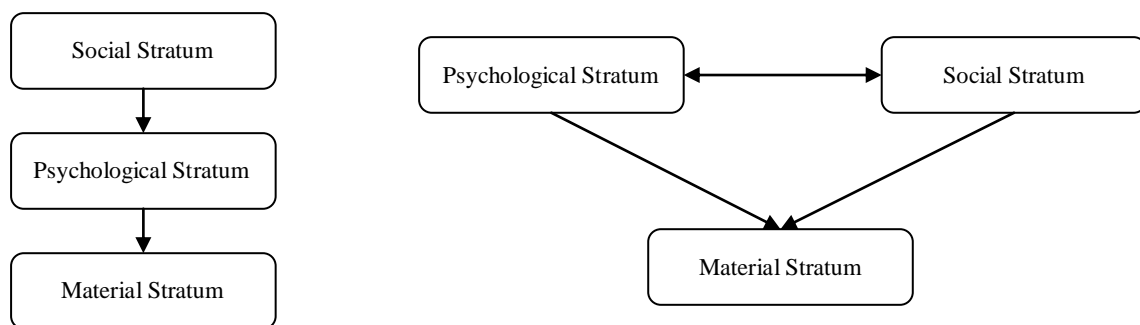


FIGURE 1. Left: Linearly organized strata. Right: Strata with bilateral dependence

On this view, the social realm is founded on the psychological stratum, which in its turn is founded on the material one. Likewise, the material stratum is the bearer of the psychological stratum, which in its turn is the bearer of the social one. The point of view illustrated by the left side of Figure 1 is part of the received wisdom. However, a different option is possible. Consider the right side of Figure 1.

Material phenomena act as bearers of *both* psychological *and* social phenomena. In their turn, psychological and social phenomena reciprocally determine each other. Psychological and social systems are formed through co-evolution, meaning that the one is the environmental prerequisite for the other.

The next step is to articulate the internal organization of each stratum. Analysis shows that the internal organization of the three strata exhibits different patterns.

¹ Even if my vision is substantially different from Hartmann’s, his contribution is a required starting point for anybody interested in the problem of levels of reality.

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