10

Klein Bottle: *Le tube de caption*, or, the Subject's Snout[1]

Slavoj Žižek

I A Snout in Plato's cave

In October 2017, the media reported that archaeologists had discovered a thirty-meter-long tunnel hidden within the limestone and granite walls of the Great Pyramid of Giza. Since its function was not clear, they simply—and quite adequately—referred to it as "the Void."[2] The pyramid was thus confirmed to be a gigantic *Ding* in the Heideggerian sense, a massive form enveloping a void, which is its true "object." Where does this strange need to redouble the void, to isolate some space in the infinite void of our universe and, in the midst of this enclave, reproduce another void come from? To grasp this, we have to change our most basic view of reality.

The predominant philosophical view today is that of the openness towards the world: we are not separated from external reality through the wall or screen of our mental representations, we are always-already in the world, thrown into it and engaged in it, so (as the early Heidegger put it) the question "How can we reach beyond our representations into reality itself?" is a wrong one, it presupposes a gap (between our representations of things and things themselves) it tries to overcome … This predominant view is right in the sense that the whole image of our Self "inside" and the external reality "outside," with the concomitant problem of how can I step outside my mind and reach external reality the way it is in itself, should be discarded; however, it should not be discarded in this predominant way of asserting our "being-in-the-world" (we are always-already thrown in the world). Following the model of the convoluted space, we should rather explore how, if we go deep "inside" our Self, behind the phenomenal self-experience of our thought, we can again find ourselves in the (immanent) outside of neuronal processes—our singular Self dissolves in a pandemonium of processes whose status is less and less "psychic" in the usual sense of the term. The paradox is thus that I only "am" a Self at a distance not only from outside reality, but also from my innermost inside: my inside remains inside only insofar as I do not get too close to it. We should thus propose another model to replace the couple of my mental life "inside" and the reality "outside": that of the Self as a fragile screen, a thin surface separating the two outsides, that of the external reality and that of the Real.

Against the predominant view, one should therefore shamelessly assert the idea that we live in a closed universe, like prisoners in Plato's cave. We could thus re-tell the story of Plato's cave. In a general approach, we should read Plato's parable as a myth in the Lévi-Straussian sense, so that one has to look for bits of meaning not through its direct interpretation, but rather by way of locating it in a series of variations, i.e., by way of comparing it with other variations of the same story. The elementary frame of the so-called "postmodernism" can effectively be conceived as a network of three modes of inversion of Plato's allegory. First, there is the inversion of the meaning of the central source of light (sun): what if this center is a kind of Black Sun, a terrifying monstrous Evil Thing, and for *this* reason impossible to sustain? Second, what if (along the lines of Peter Sloterdijk's *Spheres*) we invert the meaning of the cave: what if it is cold and windy out in the open, on the earth's surface, too dangerous to survive there, so people themselves decided to dig out the cave to find a shelter/home/sphere? In this way, the cave appears as the first model of building a home, a safe isolated place of dwelling—building one's cave is what distinguishes us from beasts, it is the first act of civilization. Finally, there is the standard postmodern variation: the true myth is precisely the notion that, outside the theatre of shadows, there is some "true reality" or a central Sun—all there is are different theatres of shadows and their endless interplay. The properly Lacanian twist to the story would be that for us, within the cave, the Real outside the cave can only appear as a *shadow of a shadow*, as a gap between different modes or domains of shadows. It is thus not simply that substantial reality disappears in the interplay of appearances; what rather happens in this shift is that the very irreducibility of the appearance to its substantial support, its "autonomy" with regard to it, engenders a Thing of its own, the true "real Thing." Furthermore, there is an aspect of Plato's story of the cave that touches upon the innermost tension of the process of emancipation, bringing out yet another version of the Moebius strip reversal, this time between freedom and servitude:

> The exit from the cave begins when one of the prisoners is not only freed from his chains (as Heidegger shows this is not at all enough to liberate him from the libidinal attachment to the shadows), but when he is forced out. This clearly must be the place for the (libidinal, but also epistemological, political, and ontological) function of the master. This can only be the master who neither tells me what precisely to do nor represents the one whose instrument I could become; instead, he is the one who just "gives me back to myself." And in a sense, one might say this could be connected to Plato's anamnesis theory (remembering what one never knew, as it were) and implies that the proper master just affirms or makes it possible for me to affirm that "I can do this," without telling me what this is, that is, without telling me (too much of) who I am.[3]

The point Ruda makes here is a subtle one: it's not only that if I am left to myself in the cave, even if without chains, I prefer to stay there, so that a master has to force me out—I have to volunteer to be forced out, similarly to the way in which, when a subject enters psychoanalysis, he volunteers to do it, i.e., he voluntarily accepts the psychoanalyst as his master (albeit in a very specific way):

> Precisely at this point, the reference to the master in psychoanalytic terms provokes the question: does this mean that those who need a master are—always already—in the position of the analysand? If—politically—one needs such a master in order to become who one is, to use Nietzsche's formula (and this can be structurally linked to liberating the prisoner from the cave, i.e., forcing him out after the chains have been taken off and he still does not want to leave), the question arises how to link this with the idea that the analysand must constitutively be a *volunteer* (and not simply a slave or a bondsman). So, in short, there must be a dialectics of master and volunteer(s): a dialectics because the master to some extent constitutes the volunteers as volunteers (liberates them from a previously seemingly unquestionable position), so that they then become voluntary followers of the master's injunction, whereby the master ultimately becomes superfluous. Of course, the master becomes obsolete only for a certain period of time, for afterwards one has to repeat this very process. One never leaves the cave entirely, so to speak, one constantly has to re-encounter the master, and the anxiety linked to it, such that there must always be a re-punctuation if things get stuck, or mortifyingly habitualized, again.[4]

What further complicates the picture is that

> capitalism relies massively on unpaid and thereby structurally "voluntary" labour. There are, to put it with Lenin, volunteers and "volunteers," so, maybe, one has to not only distinguish between different types of master-figures, but also link them (if the link to psychoanalysis is pertinent in this way) to different understandings of the volunteer (i.e., the analyzand). Even the analyzand as a volunteer must be somehow forced into analysis. This might seem to bring classical readings of the master-slave dialectics back onto the stage, but I think one should bear in mind that as soon as the slave identifies himself as a slave, he is no longer a slave, whereas the voluntary worker in capitalism can identify himself as what he is and this changes nothing (capitalism interpellates people as "nothings," volunteers, etc.).[5]

These two levels of volunteering (which are simultaneously two levels of *servitude volontaire*) are different not only with regard to the content of servitude (to market mechanisms, to an emancipatory cause), but their very form is different. In capitalist servitude, we simply feel free, while in authentic liberation, we accept voluntary servitude as serving a Cause and not just ourselves. In today's cynical functioning of capitalism, I can know very well what I am doing and continue to do it, but the liberating aspect of my knowledge is nevertheless suspended, while in the authentic dialectics of liberation, the awareness of my situation is already the first step of liberation. In capitalism, I am enslaved precisely when I "feel free." This feeling is the very form of my servitude. In an emancipatory process, on the other hand, I am free when I "feel like a slave," i.e., the very feeling of being enslaved already bears witness to the fact that, in the core of my subjectivity, I am free. In other words, only when my position of enunciation is that of a free subject, can I experience my servitude as an abomination. Here, we are thus faced with two versions of the Moebius strip reversal:

if we follow capitalist freedom to the end, the I turns into the very form of servitude, and if we want to break out of the capitalist *servitude volontaire*, our assertion of freedom again has to assume the form of its opposite, of voluntarily serving a Cause.

So, let's add yet another version of Plato's cave, that of the inside of the Klein bottle. A traveler/subject walks on the rounded surface of proto-reality and falls into the abyss (like an atom falling in Ancient Greek atomism); instead of just disappearing into the abyss, the traveler/subject makes a "clinamenesque" turn, redirects the tube into which he is falling aside, then makes a U-turn, and ends up looking up at the rounded space of the cave (which is the same surface upon which he was walking at the beginning, but this time seen from the inside). What a spectator sees inside the bottle is like the monolith depicted in Arnold Böcklin's "Isle of the Dead" (among many other references, it was used by Patrice Chéreau as the model for Brünhilde's rock in his famous 1976 staging of Wagner's *Ring*)—an enclosed space evoking a scene-setting. This closed circular space is of course sustained by a complex stage machinery—but our awareness of it paradoxically does not ruin its magic effect. More threatening than the awareness of this machinery is the protuberance (tube) that functions as a blind spot in the image, the point where we, the spectators, are inscribed into it. If an idiot comes along and wants to erase this protuberance, the result would not be a perfect image but the dissolution of the knot which held it together, and thereby a complete disintegration of (its) reality. "I was the world in which I walked, . . ."[6]—the task is to read these lines in a totally non-solipsist way: it is not that I am the sole source of my reality so that it only exists in my mind, but that me and my reality form a (truncated) whole, which disintegrates if I am cut out of it, and what the Klein bottle model enables us to do is to deploy the process through which this closed whole emerges.

One should note here that this view is confirmed by today's cognitive sciences—Thomas Metzinger proposes a rereading/radicalization of the three standard metaphors of the human mind: Plato's cave, the representationalist metaphor, and the metaphor of a total flight-simulator. As to Plato's cave, Metzinger endorses its basic premise: we misperceive a phenomenal "theatre of shadows" (our immediate experience of reality) for reality, we are constrained by this illusion in a necessary "automatic" way, and we should struggle to achieve true self-knowledge. Where he differs is with regard to a very precise point: there is no self who is tied down in the middle of the cave and can then leave the cave in search of the true light of the sun:

> There are low-dimensional phenomenal shadows of external perceptual objects dancing on the neural user surface of the caveman's brain. So much is true. There certainly is a phenomenal *self*-shadow as well. But what is this shadow the low-dimensional projection *of*? . . . [I]t is a shadow not of a captive person, but of the cave as a whole. . . . There is no true subject and no homunculus in the cave that could confuse itself with anything. It is the cave as a whole, which episodically, during phases of waking and dreaming, projects a shadow of itself onto one of its many internal walls. The cave shadow is there. The cave is empty.[7]

This brings us to the second—representationalist—metaphor: our phenomenal experience is a dynamic multidimensional map of the world—but with a twist: "like

only very few of the *external* maps used by human beings, it also has a little red arrow. . . . [T]he phenomenal self *is* the little red arrow in your conscious map of reality."[8] Metzinger refers to city, airport or shopping mall maps in which a little red arrow stands for the observer's location within the mapped space ("You are here!"):

> Mental self-models are the little red arrows that help a phenomenal geographer to navigate her own complex mental map of reality. . . . The most important difference between the little red arrow on the subway map and the little red arrow in our neurophenomenological troglodyte's brain is that the external arrow is *opaque*. It is always clear that it is only a representation—a placeholder for something else. . . . The conscious self-model in the caveman's brain itself, however, is in large portions transparent: . . . it is a phenomenal self characterized not only by full-blown prereflexive embodiment but by the comprehensive, all-encompassing subjective experience of *being situated*.[9]

This "red arrow," of course, is what Lacan called the signifier, which represents the subject for other signifiers; and our total immersion into the map brings us to the third metaphor, that of a *total flight simulator*:

> The brain differs from the flight simulator in not being used by a student pilot, who episodically 'enters' it. . . . A total flight simulator is a self-modeling airplane that has always flown without a pilot and has generated a complex internal image of itself within its *own* internal flight simulator. The image is transparent. The information that it is an internally generated image is not yet available to the system as a whole. . . . Like the neurophenomenological caveman, "the pilot" is born into a virtual reality right from the beginning—without a chance to ever discover this fact.[10]

There is, however, a vicious circle in this version of the cave argument (a cave projects itself onto the cave-wall, and *it generates/simulates the observer itself*): while the cave can simulate the substantial identity/content of the observer, it cannot simulate the FUNCTION of the observer, since, in this case, we would have a fiction observing itself, like Escher's hand drawing a hand that, in turn, draws the first hand. In other words, while what the observer immediately identifies with the experience of self-awareness is a fiction, something with no positive ontological status, *his very activity of observing is a positive ontological fact*. And it is at this point that we should return to the model of the Klein bottle: what Metzinger ignores is the additional convolution, the "snout," which gives birth to the very observer. Or, to put it in a somewhat simplified way: Metzinger's limit is that his model implies a simple clear-cut distinction between reality (of the neuronal mechanism) and fiction (of the autonomous self as a free agent); while this model explains how fiction is generated by objective neuronal processes, it ignores how these objective neuronal processes have to rely on an efficient fiction, i.e., how they can only function if, in the guise of the "snout" that is the subject, fiction intervenes into reality.

In the second staircase murder (of Detective Arbogast) from Hitchcock's *Psycho* (1960), we first get the Hitchcockian God's-point-of-view, shot from above of the entire

scene taking place on the first floor corridor and stairs; when the shrieking creature enters the frame and starts stabbing Arbogast, we pass to the creature's subjective point-of-view, a close-up of Arbogast's face falling down the stairs and being sliced up—as if, in this twist from an objective to a subjective shot, God himself had lost his neutrality and "fallen into" the world, brutally intervening in it, delivering justice. Another exemplary case of such impossible subjectivity is the famous God's-view-shot of the burning Bodega Bay in Hitchcock's *The Birds* (1963), which is then, when the birds enter into the frame (as if from behind the viewer's back), re-signified, subjectivized, transformed from the objective view-from-nowhere of the entire town into the point-of-view of the evil aggressors themselves. A similar reversal should be accomplished in order to effectively break out of Plato's cave: the point is not to penetrate "true" external reality beyond the curved wall, but to take into account how our "objective" view of reality is already subjectivized, how it functions as the view from the standpoint of the impossible/monstrous Thing—the task is not to erase my subjective point-of-view, but to relocate it into the Thing itself, or, as medieval Christian mystics would have put it, the task is not to erase my subjectivity and immerse myself directly into the divine substance, but to become aware of how my view of God is simultaneously the view of God himself upon himself. Again, therein resides the lesson of the Klein bottle: insofar as my view of the curved wall inside the bottle originates in the twisted snout, it is the Real itself which observes itself on the wall of Plato's cave. In a homologous way, Bohr rejected the reproach that his interpretation of quantum physics involves subjectivism since it denies objective reality, making the collapse of the wave function dependent on measurement: he insisted on the objectivity of measurement (independency of the scientist's subjectivity), defining this objectivity as the fact that the measurement, no matter how often repeated at different times and places, always gives the same result. Is this not close to Lacan's early definition of the Real as that which always returns to its same place? Objectivity (of our knowledge), the fact that we are not caught in our subjective representations, is thus not to be looked for in the domain of "objective reality" independent of our activity, but in the whole situation into which we are included.

The feature which is irrepresentable in the Klein bottle (irrepresentable in our three-dimensional space) is the snout-like break through the outer skin, and this snout is the subject. When this snout turns back into the main body, we find ourselves inside, in a cave-like round space, whose openness is disturbed by the same snout seen from the inside and connecting the rounded top with the background circular wall—this inner circular space, like the inside of Plato's cave, is our reality, and looking at this wall of reality, the subject sees it as a complete image, i.e., it doesn't see the snout protruding out of it because the snout is the blind spot of the image, the subject's own inscription in the image.[11] From the inside, this snout is an empty tube, a subject ($), and from the outside (looked upon as it appears in the cave), it is an object, *objet a*, the subject's stand-in. The rounded enclosed surface that is our reality seems the very opposite of the modern scientific notion of an open "cold" universe: it brings back to mind the medieval drawings of the universe as a gigantic finite cupola on which stars are painted, and from where we can break through and see the chaotic infinite outside. Brought to the extreme, this vision gives us the impression of the so-called Concave Earth theory, popular in the

obscurantist early twentieth-century pseudo-science, with many advocates among the Nazis. According to this theory, the Earth is on the inner instead of the outer side of a sphere, a hole in the vast eternal ice, and the Sun is in the middle of this hollow. (In Nazi Germany, they actually used mirrors and telescopes to try to look "across" the inside of the Earth and spot British ships in the North Sea.) One should notice that the proponents of this theory saw it as the Aryan answer to the Jewish-scientific vision of an infinite universe. So how can this closed universe generate the illusion of openness? Recall the ridiculously ingenious Christian reply to the Darwinist challenge. One of Darwin's contemporaries proposed a ridiculously perspicuous reconciliation between the Bible and evolutionary theory: the Bible is literally true, the world was created approximately 4,000 years BCE—so how can we explain the fossils? The solution is that they were directly created by God as fossils to give humanity a false sense of opening, of living in an older universe. In short, when God created the universe, he created traces of its imagined past. Post-Kantian transcendentalism answers the challenge of objective science in a similar way: if, for the theological literalists, God directly created fossils in order to expose men to the temptation of denying the divine creation, i.e., to test their faith, the post-Kantian transcendentalists conceive the spontaneous everyday "naïve" notion of objective reality existing independently of us as a similar trap, exposing humans to the test, challenging them to see through this "evidence" and grasp how reality is constituted by the transcendental subject. We should nonetheless insist that the Christian solution—meaningless as a scientific theory, of course—does contain a grain of truth: it provides an implicit adequate theory of ideology. Does every ideology not also directly create fossils, i.e., does it not create an imagined past which fits the present? This is why true historicity is opposed to evolutionist historicism, or, this is why, paradoxically, true historicity always asserts what French structuralism formulated as the "primacy of synchrony over diachrony." Usually, this primacy was taken to mean the ultimate denial of historicity in structuralism: a historical development can be reduced to the (imperfect) temporal deployment of a pre-existing atemporal matrix of all possible variations/combinations. This simplistic notion of the "primacy of synchrony over diachrony" overlooks the (properly dialectical) point, made long ago by (among others) T. S. Eliot, on how each truly new artistic phenomenon not only designates a break from the entire past, but retroactively changes this past itself. At every historical conjuncture, the present is not only the present, it also encompasses a perspective on the past immanent to it—after the disintegration of the Soviet Union in 1991, for example, the October Revolution is no longer the same historical event, i.e., it is (for the triumphant liberal-capitalist view) no longer the beginning of a new progressive epoch in the history of humanity, but the beginning of a catastrophic misdirection of history, which reached its end in 1991.

Thus, our universe of ideological meaning IS closed, its openness is illusory, the result of the invisibility of its limitation. Furthermore, it is not only that we do not perceive the limitation of our ideological universe of meaning; what we also don't perceive is the "snout," the blind spot of this universe. The exclusion of this object-snout is constitutive of the appearance of reality: since reality (not the Real) is correlative to the subject, it can only constitute itself through withdrawing from the object which "is" the subject, i.e., through withdrawing the subject's objectal correlate.

Here, we can see clearly the difference between the Moebius strip and the Klein bottle: in the Moebius strip, we pass from one side of the strip to the other, or from one term to its opposite, while in the Klein bottle, we pass from the hole in the midst of a circular body to the substance of this body itself, i.e., the void returns as the very body that envelops it. Only in this way do we arrive at subjectivity—why? The subject IS pure difference, and it emerges as such when this difference is no longer reduced to a difference between parts of some substantial content.

II The stupid God of quantum ontology

It is crucial to draw the ontological consequences of this metaphor of the Klein bottle, consequences which can be clearly deployed with reference to quantum physics. Let us take as our starting point Carlo Rovelli's advocacy of quantum gravity.[12] Rovelli tries to bring together the theory of relativity and quantum mechanics by positing the quantum nature of space and time: they are not a continuum that can be divided *ad infinitum*, there is a minimal unit of space-time which cannot be further divided. (Incidentally, this makes it easy to solve Zeno's paradox of Achilles being unable to catch up a turtle—Achilles cannot do it only if we presume the infinite divisibility of time and space.) The consequences of this premise are radical. First, they undermine the hypothesis of the Big Bang, the infinitely condensed point of matter, which then exploded and gave birth to our universe. If time and space are quantum entities, they cannot be infinitely condensed. There is a limit of their density defined by the minimal quanta of space and time (they cannot get smaller than their quanta), which means that a different cosmological model imposes itself, that of the "aeons" of the universe and of the Big Bounce: a universe is collapsing into a black hole, but this contraction can never reach its zero-point since its quantum poses a limit, so after a certain point it has to "bounce back" and explode. The ultimate implication of quantum gravity is that space and time are not the basic constituents of reality: if space-time is composed of quantum waves (whose convolutions give birth to gravity, so we get the unity of quantum mechanics and relativity), then the last duality between space-time and the particles or waves which fluctuate IN space-time has to be abandoned. This is how Rovelli answers the big question "What is the world made of?":

> [T]he particles are quanta of quantum fields; light is formed by quanta of a field; space is nothing more than a field, which is also made of quanta; and time emerges from the processes of this same field. In other words, the world is made entirely from quantum fields.
>
> These fields do not live *in* spacetime; they live, so to speak, one on top of the other: fields on fields. The space and time that we perceive in large scale are our blurred and approximate images of one of these quantum fields: the gravitational field.
>
> Fields that live on themselves, without the need of a spacetime to serve as a substratum, as a support, and which are capable by themselves of generating spacetime, are called "covariant quantum fields."[13]

Even the most elementary duality between space-time and the particles (or fields made of waves) which move and vibrate IN space-time thus falls away in this "basic grammar of the world"[14]—at this level, one has to relinquish "the idea of space, and of time, as general structures within which to frame the world."[15] Quantum fields do not vibrate IN space-time, they are themselves segments of space-time—what we encounter here is yet another version of the reversal that characterizes the Moebius strip: if we begin with our common reality, where things and processes take place IN space and time, and then progress in our scientific analysis to the very basic constituents of reality, we encounter in the domain of waves (what we experience in our ordinary reality as) their temporal/spatial form as another element of content, as another quantum wave function. Space-time is (in our reality) the form/container of material processes and (at the most basic level) these processes themselves at their most fundamental—again, form is inscribed into its content as one of its moments. The big question here is, of course, how do time and space—in the usual sense, as the formal containers IN which material processes take place—emerge out of this basic reality of quantum fields? Rovelli's answer:

> What does "the passage of time" mean, if time plays no part in the fundamental description of the world? The answer is simple. The origin of time may be similar to that of heat: it comes from averages of many microscopic variables.[16]

The underlying idea is that "it is always heat and only heat that distinguishes the past from the future."[17] When a process is fully reversible (like moving up and down, etc.), there is no temporality proper in it; the future and the past coincide since we can change the direction of time and the process remains the same. Only when a process is irreversible—say, when we burn a piece of paper to ashes and then cannot change the ashes back into paper—do we get time, i.e., a temporal movement that proceeds univocally from the past to the future. Such temporal processes only take place at the macroscopic level, in our ordinary reality, since at the microscopic level of the "basic texture" of reality (quantum waves), loops are always closed, and processes are reversible. Irreversible processes always and by definition involve heat—when an object burns, we cannot travel back and reconstitute it; when an object loses heat (cools), it cannot be heated again without external intervention; etc. Heat arises when subatomic particles closely mingle and bump into one another, and such processes take place only above the basic texture of the universe, at a macroscopic level where we are not dealing with single particles but with averages of millions of single occurrences:

> As long as we have a *complete* description of a system, all of the variables of the system are on the same footing; none of them acts as a time variable. That is to say: none is correlated to irreversible phenomena. But as soon as we describe the system by means of averages of many variables, we have a preferred variable that functions like common time. A time along which heat is dissipated. The time of our everyday experience.
>
> Hence time is not a fundamental constituent of the world, but it appears because the world is immense, and we are small systems within the world,

> interacting only with macroscopic variables that average among innumerable small, microscopic variables. We, in our everyday lives, never see a single elementary particle, or a single quantum of space. We see stones, mountains, the faces of our friends—and each of these things we see is formed by myriads of elementary components. We are always correlated with averages: they disperse heat and, intrinsically, generate time . . .
>
> Time is an effect of our overlooking of the physical microstates of things. Time is information we don't have.
>
> Time is our ignorance.[18]

In order to account for the passage from quantum reality to ordinary reality, Rovelli thus relies on the notion of statistical average, which is obviously not adequate: when we perceive an object as a chair or a table, or already a letter as a letter, we perceive an idealized form, which persists as the same and is in its identity more than an average. Macroscopic "illusions" based on our ignorance have a status and an efficiency of their own. The key question is therefore: why does a "complete description" not include high-level orders? Rovelli seems to imply that "completeness" covers just the basic texture of quantum reality, without any higher-level phenomena (such as organic life or the universe of signification) since they take place in temporal reality and are thus based on ignoring the physical microstates of things. Just think about language alone: in order to get the meaning of spoken words, we have to ignore their microscopic reality (of sound vibrations, etc.). Or, at a more elementary level, think about desert sand moved by strong wind: it seems to our view that the same form is slowly moving across the desert, although a more "complete" description would have to cover myriads of grains of sand moving and rubbing each other. From the Hegelian standpoint, ignoring the more basic level is a positive condition of perceiving the higher unity, so a truly "complete description" would have to incorporate this ignorance—there is no "synthesis" between the basic quantum wave level and, say, our speech that produces meaning. To get one, we have to ignore the other. This brings us to Hegel's notion of totality, which also includes levels grounded on ignoring parts of reality. Rovelli writes that

> we must not confuse what we know about a system with the absolute state of the same system. What we know is something concerning the relation between the system and ourselves.[19]

But is in this sense the "absolute state" of a system not constrained to the interaction among its basic constituents, without regard to the higher-level orders that arise out of it? So does the "absolute state" not leave out of consideration many "higher" levels? How can we consider a description of language activity that leaves out of consideration the effect of meaning "complete"? To avoid these problems, Rovelli brings in the orderly arrangements of elementary particles:

> As Democritus said, it is not just a question of these atoms but also of the *order* in which they are arranged. Atoms are like the letters in an alphabet: an extraordinary

> alphabet, so rich as to be able to read, reflect and even think about itself. We are not atoms, we are *orders* in which atoms are arranged, capable of mirroring other atoms and mirroring ourselves.[20]

Arrangements, of course, begin at the basic quantum level, but—from our standpoint, at least—crucial arrangements take place at higher macroscopic levels, precisely like the letters of an alphabet—so how come that (following Democritus) Rovelli uses the metaphor of the alphabet to describe the arrangements of the very basic quantum level of reality? Let's return to his claim that "we must not confuse what we know about a system with the absolute state of the same system. What we know is something concerning the relation between the system and ourselves." What Rovelli calls the "absolute state" is obviously the "basic grammar of the world" made of quantum waves, in contrast to our knowledge, which is limited to the relations of a given system, to its interactions with its surroundings; however, with regard to man, he simultaneously posits that the nature of man

> is not his internal structure but the network of personal, familial and social interactions within which he exists. It is these which "make" us, these which guard us. As humans, we are that which others know of us, that which we know of ourselves, and that which others know about our knowledge. We are complex nodes in a rich web of reciprocal information.[21]

It is not only that these interactions occur at the higher macroscopic level; one should also add that when Rovelli talks about all the permutations of knowledge (what others know of us, what we know of ourselves, what others know about our knowledge . . .), which means all the permutations of the symbolic "registration" of the states of things, he forgets to add the crucial level, that of the "objectivized" knowledge, knowledge embodied in the virtual entity which Lacan calls the big Other. When I talk about other people's opinions, it is never only a matter of what I, you, or other individuals think, but also a matter of what the impersonal "one" thinks. When I violate a certain rule of decency, I never simply do something that the majority of others do not do—I do what "one" doesn't do. Recall sounds like "Oops!," which we feel obliged to utter when we stumble or do something stupid—the mystery here is that it is also possible for another person, one who merely witnesses our blunder, to say "Oops!" *for us*, and it works. The function of the "Oops!" is to enact the symbolic registration of the stupid stumbling: the virtual big Other has to be informed about it. Recall also the typical tricky situation in which all the people in a closed group know some dirty detail (and they also know that all the others know it), but when one of them inadvertently blurts out this detail, they nonetheless all feel embarrassed—why? If no one learned anything new, why do all feel embarrassed? Because they can no longer *pretend* that (or act as if) they do not know it—in other words, because now *the big Other knows it*. Therein resides the lesson of Hans Christian Andersen's "Emperor's New Clothes": one should never underestimate the power of appearances. Sometimes, when we inadvertently disturb the appearances, the thing itself behind them also falls apart. The big Other is fragile, insubstantial, properly *virtual* in the sense that its status is that of a subjective presupposition. It

exists only insofar as subjects *act as if it exists*. Its status is similar to that of an ideological cause, such as Communism or the Nation: it is the substance of the individuals who recognize themselves in it, the ground of their entire existence, the point of reference which provides the ultimate horizon of meaning to their lives, something for which these individuals are ready to give their lives, yet the only thing that really exists are these individuals and their activity, so this substance is actual only insofar as individuals believe in it and act accordingly.

So, what does this knowledge of the big Other have to do with quantum physics? Everything, since it directly concerns the so-called collapse of the wave function (which, as Rovelli is right to point out, involves a massive reduction of information): when quantum physicists try to explain the collapse of the wave function, they resort time and again to the metaphor of language—this collapse occurs when a quantum event "leaves a trace" in the observation apparatus, when it is "registered" in some way. We obtain here a relationship of externality; an event becomes fully itself, it realizes itself, only when its external surroundings "take note" of it; and this echoes the process of symbolic realization, in which an event fully actualizes itself only through its symbolic registration, its inscription into a symbolic network, which is external to it. There are large debates about the exact moment of the collapse of the wave function; the three main replies perfectly fit the Lacanian triad of the Real/Symbolic/Imaginary: the Real of measurement (when the result is registered in the measuring machine, establishing the contact between the quantum micro-reality and the ordinary macro-reality), the Imaginary of perception (when this result is perceived by a consciousness), the Symbolic of inscription (when the result is inscribed into the language shared by the community of researchers). Does this debate not signal a kind of ontological inconsistency in quantum physics? Quantum physics accounts for the collapse of the wave function (and thus for the emergence of "ordinary" reality) in the terms of the act of perception/registration (a single reality emerges through the act of measurement), but it then explains (or rather describes) this measurement in the terms of the ordinary reality, which only emerges through it (the measuring machine is hit by electrons, etc.), and this obviously involves a *circulus vitiosus*.

What this means is that the big problem is not how we can pass from the classic universe to the universe of quantum waves, but exactly the opposite—why and how the quantum universe itself immanently requires the collapse of the wave function, its "decoherence" into the classic universe, i.e., why and how the collapse is inherent to the quantum universe. Instead of just standing in awe in front of the wonder of the quantum universe, we should turn our perspective around and perceive as the true wonder the rise of our "ordinary" spatiotemporal reality. It is not only that there is no classic reality which is not sustained by blurred quantum fluctuations; one should add that there is no quantum universe which is not always-already hooked onto a piece of classic reality. The problem of the collapse of the wave function through the act of measurement is that it has to be formulated in classic, not quantum, terms—this is why

> the collapse of the wave function occupies an anomalous position within quantum mechanics. It is *required* by the fact that observations occur, but it is not predicted by quantum theory. It is *an additional postulate, which must be made in order that quantum mechanics be consistent*.[22]

One should note this precise formulation: a measurement formulated in the terms of classic reality is necessary for quantum mechanics itself to be consistent, it is the addition of classic reality which "sutures" the quantum field. Which, then, is the status of "quantum reality," i.e., of the so-called wave function Ψ, which renders the panoply of superimposed states?

> Are we to regard Ψ as actually representing physical reality? Or is it to be viewed as being merely a calculational tool for working out probabilities of the results of experiments that *might* be performed, the results of these being "real," but not the wave function itself?
>
> . . . [I]t was part of the Copenhagen interpretation of quantum mechanics to take this latter viewpoint, and, according to various other schools of thought also, Ψ is to be regarded as a calculational convenience with no ontological status other than to be part of the state of mind of the experimenter or theoretician.[23]

This reticence to concede any ontological status to Ψ "stems from the abhorrence felt by so many physicists that the state of the actual world could suddenly 'jump' from time to time in the seemingly random way that is characteristic of the rules of quantum measurement"[24]: in the act of measurement, the wave function "collapses," it is reduced to just one reality, so how can such an act affect objective reality, erasing the multiplicity of superimposed states? ("In quantum mechanics when we interact with a system, we don't only learn something, we also 'cancel' a part of the relevant information about the system"[25]—this reduction is unthinkable in our standard reality.) The most radical opposite version is that of the MWI (many-worlds interpretation), which admits no such reduction: ALL possibilities contained in a wave function are actualized. However, as we have already seen, the true opposite of the Copenhagen orthodoxy is not MWI, but the interpretation which, on the contrary, reads the wave function (the quantum space-time) as the ultimate reality, and conceives our spatiotemporal reality as a kind of ontological illusion, as a product of our ignorance and cognitive limitation. So which version is the right one, or at least the better one? To paraphrase Stalin, they are both worse, their very alternative is wrong—one should insist on the ultimate undecidability of this choice, none of the two levels should be elevated into the true reality.

This undecidability does not imply a symmetry of the two levels. As materialists, we should posit that there is nothing but quantum waves that forms the "basic grammar" of reality, there is no other reality, but this nothing is in itself a positive fact, which means that there must be some kind of a gap/cut in this "basic grammar," a gap/cut which opens up the space for the collapse of the wave function. This brings us back to the model of the Klein bottle: insofar as its rounded surface stands for the Real, i.e., the "mollusk" of the basic texture of quantum waves, and insofar as this texture is pre-ontological, a "less than nothing," the hole in its midst indicates that something, a kind of abyssal attractor, drags down the field, pushing "less than nothing" to Nothing, to the Void against the background of which something (our reality) may emerge. So we don't just have the duality of "infrastructural" quantum waves and a "superstructural" macroscopic reality: there is a third level, the abyssal Void, through which the pre-ontological Real is transubstantiated into macroscopic reality; through this

transubstantiation, all the higher-level entities emerge, including the agents of observation/measurement of quantum waves, but also what we experience as the empty (spatial and temporal) form of macroscopic reality. Kant was right here—time and space are forms, not just the statistic average of space-time oscillations, and the enigma here is: how does this form detach itself from content and impose itself on all content as form? The answer is that the abyssal Void provides the distance from which form can appear as the external container of its content. At the most abstract level, the snout-like twist of the Klein bottle (rendered possible by the abyssal Void, which renders the "mollusk" of quantum waves unstable, incomplete) accounts for the rise of "objective" spatiotemporal reality out of this "mollusk." It is thus not that the "mollusk," the texture of quantum waves, happily vibrates and is just here and there accidentally punctured by an abyssal cut, which gives birth to a snout: in the unoriented closed circularity of the Klein bottle, the snout itself retroactively gives birth to the mollusk of the Real.

Notes

1 The research included in this chapter was funded by the Slovenian Research Agency (ARRS) under the research project "Language and Science: The Possibility of Realism in Modern Philosophy" (J6-7364).

2 See Cassandra Santiago and Sarah El Sirgany, "Scientists discover mysterious 'void' in Great Pyramid of Giza," CNN, updated November 3, 2017. Available at: http://edition.cnn.com/2017/11/02/world/new-void-in-pyramid-of-giza-trnd/index.html.

3 Frank Ruda, email to author, February 19, 2018.

4 Ibid.

5 Ibid.

6 Wallace Stevens, "Tea at the Palaz of Hoon," in *The Collected Poems* (New York: Alfred A. Knopf, 1971), 65.

7 Thomas Metzinger, *Being No One: The Self-Model Theory of Subjectivity* (Cambridge: MIT Press, 2004), 550.

8 Ibid., 551.

9 Ibid., 552.

10 Ibid., 557.

11 When, in a public talk, I have recently projected on the screen a short video clip displaying the gradual emergence of a Klein bottle out of a simple strip, the public reacted with embarrassed laughter—and they were right since the movement of tube-like forms penetrating themselves in a U-turn cannot but generate the impression that "something dirty is taking place, although we don't know precisely what"? (After the presentation, one member of the public approached me and told me that it looked to him as if the scene portrayed a man with a penis long enough for him to be able to twist it and penetrate himself anally. . .)

12 I must emphasize here two things. Rovelli himself points out that the theory of quantum gravity is one of the theories in competition with others (string theory, for example), and, as such, in no way universally accepted. (One should nonetheless take note that the 2017 Nobel Prize for physics was awarded to Rainer Weiss, Barry Barish and Kip Thorne for their discovery of gravitational waves: the so-called Lido

experiment they conducted detected ripples in the fabric of space-time.) Furthermore, I am, of course, not able to follow the mathematical details of this theory—I merely rely on its general description.

13 Carlo Rovelli, *Reality Is Not What It Seems* (London: Penguin Books, 2016), 167.
14 Ibid., 219.
15 Ibid., 169.
16 Ibid., 220–1.
17 Ibid., 221.
18 Ibid., 222–3.
19 Ibid., 223.
20 Ibid., 226.
21 Ibid., 227.
22 George Greenstein and Arthur G. Zajonc, *The Quantum Challenge: Modern Research on the Foundations of Quantum Mechanics* (Sudbury, MA: Jones and Bartlett, 1997), 187 (italics mine).
23 Roger Penrose, *Fashion, Faith, and Fantasy in the New Physics of the Universe* (Princeton: Princeton University Press, 2017), 198.
24 Ibid.
25 Ibid., 217.