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Categories and Dispositions. A New Look at the Distinction between Primary and Secondary Properties

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Abstract: The distinction between primary and secondary properties establishes the absolute priority, both ontological and epistemological, of quantity (objective and measurable) over quality (subjective and ineffable). In between the two properties, primary and secondary, are the dispositional properties, for example fragility, malleability, rigidity, and so on. But, from an ontological point of view, what are dispositional properties? This contribution takes into consideration two possible answers to this question: the one according to which the dispositional properties are invariant in variation and another according to which they are powers. The second answer is in turn subject to two different interpretations. We can consider dispositions, or powers, as integrally reducible to behavioral events (solubility, for example, is reduced to the fact that a certain substance melts when immersed in a certain liquid), or physical (the fragility of glass, for example, is reduced to the physical structure underlying it). However, we can consider powers as ontologically autonomous and not-grounded. This contribution aims to investigate the latter solution, with particular reference to the apparently oxymoronic notion of physical intentionality. This notion will provide a new, dynamic, and evolutionary version of the concept of disposition and at the same time offer a new look at the distinction between primary and secondary properties.

Keywords: qualitative ontology; intentionality; dispositions; qualia

1. Primary and Secondary Properties

The distinction between primary and secondary properties is one of the points in theory where, from the start of the modern era, the intertwining of science and philosophy is most openly visible. This distinction expresses a very simple idea, which is that measurable and mathematizable quantity has an absolute primacy, both ontological and epistemological, over quality. The qualitative, understood as that which concerns concrete lived experience (perceptual states such as colors, sounds, and smells; emotional states, such as desires and sentiments; evaluative states, such as the apprehension of aesthetic or moral values) is essentially dependent on subjectivity. This is not the case with the quantitative dimension, which can claim to be independent of the subject's experience.

The Galilean idea that the book of nature is written in mathematical terms[1] finds its full philosophical realization in the Cartesian perspective. For Descartes, the senses are untrustworthy because incomplete and partial (the perception of a coin will never be perfectly round, but only roundish, elliptical, flattened, depending on the angle from which we view it; the apparent form of a table will appear different according to its position, and so on); deceptive and illusory (the oar seems straight when out of the water, but broken when immersed in the water; asphalt in the heat seems

[1] This is a fortiori true since Galileo refers to triangles, circles, etc., that is to geometry.

wet; if we look at snow and then at the sun, what at first was white appears yellow; sugar seems to taste bitter when we are ill, and so on); mutually conflicting (a surface can seem smooth to the eye but rough to the touch); erroneous (as in any type of hallucination in which we see things that do not really exist); ambiguous (as in famous Gestalt figures such as the duck-rabbit).

As is well known, Descartes signals an irreversible turn in relations between body and mind, and above all in the nature of the mental. The mind becomes something specifically immaterial, a substance separate from bodies (our own body included), totally extraneous to the material order of the world. Descartes' idea is this: the physical world is a great mechanism whose functioning is mathematically described by quantitative physics. The sole exception is thought, which does not allow itself to be reduced to such a mechanism and is substantially extraneous to the material and natural world. Quantitative-mathematical explanations can therefore be applied to everything, with the sole exception of the human mind. Thus, we come to create that explanatory void which is at the origin of the tension present in what Ryle calls the official theory of mind [1]: that is, mind–body dualism. In Descartes, this ontological antireductionism is the direct consequence of total adhesion to the scientific revolution initiated by Galileo. The presupposition is that if, in an illusion, even bodies are not as they actually appear, they will nevertheless be endowed with constituent properties necessary for being called things: extension, shape, quantity, size, number, place, time; in other words, the so-called primary properties independent of the subject's epistemic stance.

Descartes accepts without reservation the new science of material bodies: the primary qualities express the essence of material things, their objective nature. Mathematical and geometrical structure is not an object of experience but graspable only by the intellect.

At the same time, the famous example of wax expounded by Descartes in the second of his *Metaphysical Meditations*, constitutes a proof of the ontological priority of the primary qualities over the secondary, and of the epistemological priority of intellectual knowledge over the sensory, thereby setting a seal on the absolute priority of quantity over quantity on the one hand, and of cognition over sensory experience on the other: a priority with which we are ceaselessly presented even today, for example in the inexhaustible debate in philosophy of mind about the nature of the *qualia*.

But the example of the wax is also relevant, and perhaps for a different reason, which is the identification of a sort of intermediate level which dwells epistemologically in the imaginative faculty and ontologically in what we today would call dispositional properties; that is, those properties which express the disposition to behave in a certain way, such as fragility, malleability, rigidity, elasticity, ductility, etc. In this respect, the entire picture constructed by Descartes revolves around the concept of variation and the complementary one of invariance. The example of wax offers Descartes the opportunity to reaffirm the instability and unreliability of sensory experience. When brought close to fire, the sensory characteristics of wax are lost and yet, despite this, anyone who perceives the wax believes he has *the same* piece of wax before his eyes. Therefore, this identity seems to consist not in sensory characteristics, but in properties which indicate the potential for variation in the sensory properties themselves, as is clearly shown in the following passage.

> It could certainly be nothing of all that the senses brought to my notice, since all these things which fall under taste, smell, sight, touch, and hearing, are found to be changed, and yet the same wax remains. Perhaps it was what I now think, viz. that this wax was not that sweetness of honey, nor that agreeable scent of flowers, nor that particular whiteness, nor that figure, nor that sound, but simply a body which a little while before appeared to me as perceptible under these forms, and which is now perceptible under others. But what, precisely, is it that I imagine when I form such conceptions? Let us attentively consider this, and, abstracting from all that does not belong to the wax, let us see what remains. Certainly nothing remains excepting a certain extended thing which is flexible and movable. But what is the meaning of flexible and movable? [2] (p.11)

It is true that the sensory properties of wax change but, despite this, it remains the same since it is *flexible* and *movable*. In this way, Descartes makes the transition from sensory properties, essentially bound to the here and now, to dispositional properties based on the possibility of variation in the sensory properties themselves. We cannot, in the true sense of the word, *experience* the latter. We can perceive the breaking of the glass, but not its fragility; the melting of the wax, but not its ductility or malleability. In each case, the latter can only be imagined.

There remains one other step to take. For Descartes, any body can assume an indefinite variety of forms and yet remain the same piece of wax. Disposition, by its very nature, cannot exhaust this infinitude; nor can it be grasped by the imagination, which is still rooted in perception. This argument moves towards the priority of the primary properties on the one hand and of the intellective faculty on the other. The former guarantees identity when faced with the sensory properties' infinite possibility of variation, the latter the possibility of grasping that very possibility.

> No, certainly it is not that, since I imagine it admits of an infinitude of similar changes, and I nevertheless do not know how to compass the infinitude by my imagination, and consequently this conception which I have of the wax is not brought about by the faculty of imagination. What now is this extension? Is it not also unknown? For it becomes greater when the wax is melted, greater when it is boiled, and greater still when the heat increases; and I should not conceive [clearly] according to truth what wax is, if I did not think that even this piece that we are considering is capable of receiving more variations in extension than I have ever imagined. We must then grant that I could not even understand through the imagination what this piece of wax is, and that it is my mind alone which perceives it. I say this piece of wax in particular, for as to wax in general it is yet clearer. [2] (p.11)

Therefore, neither obscure and confused sensory knowledge nor incomplete and partial imaginative knowledge are adequate instruments for grasping the identity of an object in the given infinitude of its variations. Only intellective knowledge (which is clear and distinct) can guarantee such identification, and only the primary properties (which are quantifiable and measurable) can take account of the identity of the object in the infinite variety of its sensory characteristics.

The explicit signaling of infinitude is essential since it refers us back to the project of mathematizing nature, and more specifically the sensible material thing, which is a presupposition, not a consequence, of the Cartesian argument. The ontological priority of the primary properties over the secondary (or sensible) and dispositional properties, united to the epistemological priority of the intellective faculty over the sensory and imaginative, are branches of the same paradigm which conceives of the material thing as invariance in relation to infinite variations, and of the latter as accessory and residual in relation to the absolute priority of invariance. The autonomy of the primary properties from the subject, given the seal of approval by Galileo and reiterated by Descartes, has the precise aim of safeguarding a static conception of nature founded on fidelity to the postulate of invariance in variation.

2. The Mathematization of the Plena: The Phenomenological Paradigm

In *The Crisis of the European Sciences*, the Husserlian reconstruction of the Galilean approach to the science of nature is closely tied to the problem of the mathematization of the plena. It would be Husserl himself who proclaimed Galileo's limitations, but also his audacity, as "at once a discovering and a concealing genius [*entdeckender und verdeckender Genius*]" [3] (p. 51). What exactly has been concealed by Galileo? To answer this question, we need to recall what the nature of the sensible material object is, according to Husserl, and its relationship with the geometrical and mathematical thing. For Husserl, these are the characteristics of the things of experience: vagueness, inexactness, non-ideality, non-deducibility, singularity. In contrast, the mathematical or geometrical thing has these essential characteristics: univocality, ideality, exactness, deducibility, generality. The things of experience are morphological and do not tend towards any ideal limit: mathematical or geometrical

things are exact, since they tend towards ideality: that is, they have an infinite possibility of variation with a *tendency* towards the ideal limit. While the imagination can only transform sensible forms into other sensible forms, idealization exploits the infinite possibility for improvement intrinsic in the oscillations of extension (the graduality of the more or less smooth, the more or less circular, etc.) in a process which tends towards an ideal limit. The fundamental forms (straight lines, triangles, circles) are founded on a characteristic of their form, and only on that: in other words, its possible variation towards an ideal limit or, if we wish, its graduality, which in turn makes its measurement possible.

This is where Galileo's first concealment resides. We have seen how the plena, though endowed with their own style, habit, and typicality, are essentially inexact, fluid, vague, morphological. They cannot be directly geometrized, since there is no approximation to ideality for the plenum and consequently no possibility of *direct* measurement. The operation performed by Galileo is to geometrize and arithmetize the sensible thing by reducing it to extension alone. Thus, the things of experience are transformed into numerical, algebraical forms, "sensory forms of something in general", "thinkable multiplicities in general". For Husserl, there would be nothing wrong in using this technique as long as it is employed *consciously*, avoiding that "concealment of meaning" which was later experienced in history and according to which "being clothed in the ideal makes us take as true being what is in fact only a method."

This is not Galileo's only artifice. There is another, yet more potent than the first, which consists in an *indirect* mathematization of the plena. We have seen how, for Galileo, the thing of experience composed of extension and plena is stripped of its plenitude. In a second step, every change to the plenum is considered as having its own "counter-figure in the realm of forms." Lastly, the order of the plena is considered as having a necessary causal nexus with the order of form. This move is what allows the emergence of physicalist reductionism for which "natures is given in formulae and can only be interpreted on the basis of the formulae." Galileo's ploy consists in disembodying and emptying one of the disembodied parts, and finally declaring its independence, creating that ideal clothing which the object will finally put on, in view of a physicalization of ontology, in which the colors, sounds, weight, and heat radiation of a body that warms nearby bodies are transformed into luminous, sonic, calorific vibrations: that is, into forms. The fundamental passages which define Galileo's inspired and concealing move are thus, extremely summarized, the following:

1. Acknowledgement of the ideality of geometry understood as the science of forms;
2. Stripping away extension from the plena and mathematization of geometry;
3. Acknowledgement of the impossibility of a direct mathematization of the plena, because of their essential and indispensable vagueness and inexactness;
4. Indirect mathematization of the plena, by means of a biunivocal association between plenum and the order of the forms;
5. Mathematization of nature, by means of the thesis that the entire book of nature is written in mathematical terms.

The argument in which Husserl reconstructs Galileo's scientific standpoint in phenomenological terms also includes the Cartesian idea of the material thing as invariant to the infinite varying of its determinations. The thing of experience has a vague and morphological character. The plenum which characterizes it, being rooted in sensible concreteness, cannot pass through infinite variations which tend towards an ideal limit. In fact, this tendency to ideality is proper only to form, not to the plenum. In this sense, *contra* Galileo and Descartes, one of phenomenology's principle aims is to requalify the secondary properties by considering them irreducible to primary qualities. Experience has its own autonomy, and the vagueness which marks it is not only not a defect to be overcome, but is the original dimension from which every abstraction and idealization takes its origin.[2] In this sense, it is possible

[2] See also [4,5].

to speak of a reversed methexis (in the Platonic sense of the term), in which the thing of physics is secondary to and derived from the thing of experience, and not vice versa.[3]

However, there is an aspect on which it is worth dwelling for a moment and which refers to an enduring conception of the qualitative as residual. Indeed, for Husserl the thing of experience is a "synolon" of extension and sensible plenum configured in various ways.

Concretely, however, the actual and possible empirical shapes are given, at first in empirical sense-intuition, merely as "forms" of a "matter" of a sensible plenum; thus, they are given together with what shows itself, with its own gradations, in the so-called "specific" sense qualities: color, sound, smell, and the like [3] (pp. 29–30).

In other words, the plenum can be conceived of as the "residue" of a formal structure idealizable and mathematizable in itself, which makes it phenomenologically possible to speak of a "pure something" totally emptied of content, an empty dimension which stands above every material or containing region. Insofar as they are safeguarded by their specificity, the secondary qualities or plena remain substantially "secondary" by virtue of their need to spread themselves over an extension, which constitutes the idealizable and primary invariant that alone permits the subsistence of the plena (colors, sounds, tactile properties, etc.).

For its own part, the plenum has neither ontological nor epistemological autonomy. From the ontological point of view, the plenum is to all intents and purposes dependent on extension. It is extension that guarantees the structuring of experience into independent parts, a fact which is fundamental for Husserl. Furthermore, if it is true that the relationship between extension and plenum is mutually foundational, it is equally true that extension enjoys an autonomy of its own, not in concrete experience but in the realm of geometrical idealization, which is not the case for the plenum. From the epistemological point of view, it is impossible to experience plena that are not diffused in an extension. This impossibility also holds for extension, but only in concrete experience since it is possible to have an intellectual intuition of geometrical figures, whereas it is not possible (*contra* Plato) to have an intellectual intuition of the plena because of their non-ideality.

For Husserl, however, non-ideality does not coincide with non-essentiality. The sensory qualities produced by eidetic reduction are authentic essences understood as invariants in variation (for example, in different kinds of illumination). A particular shade of red is a phenomenological essence, albeit vague and morphological. Eidetic reduction has the precise aim of identifying the boundaries of determined and identifiable sensory attributes, even though they are inexact. These attributes nevertheless need an extension in order to be manifest; an extension which enjoys the requisites of ideality, measurability, and fragmentability.

The morphological and inexact character that is typical of experience is, once again, a property of the sensible (qualitative) dimension and not the extensive (quantitative) dimension. Determination, invariant in variation, in fact implies the ontological primacy (although not the exhaustiveness) of extension. Thus, in the phenomenological paradigm, the distinction between primary and secondary properties is weakened but not eliminated.

3. The Hard Problem: The Problem of the Qualia in Philosophy of Mind

Let us begin with an example that is very well known in philosophy. Does a tree falling in a forest make a noise when there is nobody nearby to hear it? The immediate answer is taken for granted: naturally the tree produces a sound, even when there is nobody listening to it. But we all know that this naïve response can be replaced by a less naïve, but equally plausible one: the fall of the tree emits sound waves which radiate outwards from a center like concentric circles in water and exist irrespective of whether or not a subject receives them. If the waves are intercepted by a human ear, they are heard as the noise of a fall. If, however, the sound waves are not intercepted the sound is

[3] Even if measurement, by senses or by constructed instruments, is the only form of access we have to the physical world.

not perceived. The fact that a tree falling unobserved may emit a sound depends, therefore, on what we mean by sound. If by "sound" we mean a heard noise, then the tree falls silently. If, instead, by "sound" we mean "a distinctive spherical pattern of impact waves in the air open to public inspection and measurement given the right instruments" [6] (p.1), the falling tree does indeed make a noise.

When we speak of sound in this second sense, we are referring to physical sound; when we speak of sound in the first sense, we are referring to sound as it is experienced. The latter has two essential characteristics: it depends to an essential degree on the observer and reaches her by private access [7,8], and has an essentially, not occasionally, qualitive or phenomenological character [9,10]. The example of listening to the sound can naturally be extended to embrace all other types of experience: colors, odors, tactile qualities, and so on.

Many problems in philosophy of mind start from this observation and from what is called "the hard problem of the philosophy of mind": that is, the problem of the qualia. In other words, the problem of how subjective, qualitative states essentially linked to the first person and to the effect of experiencing them (because of which they are distinct from the quanta, which are measurable, quantifiable, and expressible in the third person) can emerge from something that is no longer qualitative in nature but quantitative: that is, material. The origin of the term qualia can be traced back to Charles Sanders Peirce, who in 1866 proposed that "there is a distinctive quale to every combination of sensation [. . .] a peculiar quale to every day and every week—a peculiar quale to my whole personal consciousness" [11]. After Peirce, Lewis in *Mind and the World Order* [12] was perhaps the first to whom the technical use of the term qualia can be attributed. For Lewis, conscious experiences present something specific, and this something is the quale. But Dennett was the first to focus on the precise nature of the qualia:

"Qualia" is an unfamiliar term for something that could not be more familiar to each of us: the ways things seem to us. As is so often the case with philosophical jargon, it is easier to give examples than to give a definition of the term. Look at a glass of milk at sunset; the way it looks to you—the particular, personal, subjective visual quality of the glass of milk is the quale of your visual experience at the moment. The way the milk tastes to you then is another, gustatory quale, and how it sounds to you as you swallow is an auditory quale; These various "properties of conscious experience" are prime examples of qualia. Nothing, it seems, could you know more intimately than your own qualia [13] (p. 381).

From the viewpoint of their ontological status, the qualia are either phenomenal and qualitative properties related to the content of subjective experience (Nagel's 'what it is like to be'), or phenomenal and qualitative properties related to the objects experienced. These are two sensibly different definitions, but the boundaries between them are rarely well addressed in philosophy of mind even though they underlie a central concept in phenomenology, one much discussed in philosophy of mind: intentionality. Among intentional states we can include convictions, desires, beliefs, and feelings: that is, all states directed towards something (perception, judgment, devotion, determination, hatred, disdain, scorn, guilt, surprise, stupor, shame); whereas among phenomenal states we can contemplate sensations (auditory, visual, gustatory, tactile, olfactory); somato-sensory experiences such as proprioceptive perceptions (pain, hunger, etc.); emotions, moods, or affective sensations (depression, anxiety, affliction, discouragement, despair, joy, cheerfulness, ill humor, fright).

The hard problem of the qualia is founded on the irreconcilability, or incommensurability, between description in the first person and description in the third person, and on the difficulty of narrowing that methodological bifurcation between manifest image and scientific image paradigmatically proposed by Sellars [14,15]. On the one hand we have the "external" or "real" world (sound waves, light radiation, etc.) and its properties (mass, form, size, surface, motion), and on the other the "internal" or "phenomenal" world and its properties (felt objects, aromas tasted, sounds heard, colors seen, and so on).

The problem of the qualia, if posed in this way, would reiterate the traditional distinction between primary and secondary properties, between the way objects actually are and the way in which they

are experienced. Except that, in the particular case of the relationship between mind and brain, this distinction causes a sort of short circuit that is hard to overcome.

Let's try to apply the distinction between primary and secondary properties to this case. The brain undoubtedly has primary properties: form, size, mass, position. The point is that the brain is associated with a mind that has qualitative experiences. The brain is not an object endowed with primary and secondary properties, but an object endowed with primary properties and capable of *producing* those experiences which will then create the opportunity for the secondary properties. But where are those experiences located? In the case of the mind–brain relationship, the distinction between primary and secondary properties does not seem so easy and natural. Hence the problem of the qualia and the proliferation of perspectives dragooned into irremediably contradictory solutions: on the one hand, reductionism of an eliminativist stamp [16,17], according to which the qualia are epiphenomena lacking any causal efficacy, or even fictitious entities, as phlogiston and the philosopher's stone were in their own time [13], and on the other hand dualism of properties which considers the qualia irreducible to any third-person scientific account. Indeed, according to the anti-reductionists [7,10,18], analogies with the identity between heat and median kinetic energy or between the lightning bolt and its electric charge often used by theorists of the identity between mental and cerebral states, are in reality misleading since mental states have a subjective dimension which is absent in the image of the world offered by science. The gigantic debate which philosophy of mind has developed around the conflict between reductionists and antireductionists constitutes the umpteenth reproposition of the irreducibility between primary and secondary properties and, in a more general sense, between scientific and manifest image.

4. Dispositions and Powers

The Cartesian and Husserlian phenomenological models share two fundamental theses. The first is the thesis of the priority of the so-called primary properties (first of all, extension) over the sensory and qualitative dimension. This thesis has a strong version (Galileo, Descartes, Churchland) which consists in the eliminability of the secondary properties in favor of the primary properties, and a weak version (Husserl) which confines itself to maintaining the ontological autonomy of the primary properties and the non-autonomy of the secondary properties. The second is a categorical conception of the qualitative: i.e., in the last analysis, the idea that the qualitative is expressed by means of attributes, which are in turn conceived of as categorical invariants. The same eidetic reduction in phenomenology is founded on the notion of invariance, which has the scope of determining and bounding the dimension of the qualitative in qualitative determinations. A categorical conception of the qualitative and the priority of extension are theses which seem to go hand in hand. We have seen how this model, attributable to a conception of the qualitative as residual, leads to the hard problem of the qualia.

However, there is an alternative path along which the two theses I enunciated earlier are replaced by the following: the priority (and not secondarity) of the sensible and qualitative dimension over extension and an agentive (not categorical) conception of the qualitative founded on the idea that qualities cannot be derived from attributes but from dispositions understood not so much in the functional sense as invariance in variation, but as powers or forces. The relationship between disposition and power can have two interpretations. The first, a deflationist type derived from so-called conditional analysis (Hume, Carnap, Lewis, Ryle), holds that the dispositions are integrally reducible to events and have no autonomy. Solubility, for example, is reduced to the fact that if a certain substance (salt, for example) is immersed in a liquid, it dissolves; fragility is reduced to the fact that if a certain substance (glass, for example) is struck, it breaks. In other words, ascribing a dispositional property amounts to no more than asserting the truth of a conditional. Apart from conditional analysis, the other theory which denies the existence of powers is reductionism of a physicalist stamp. According to Armstrong [19] (p.193), to every disposition there corresponds a categorical property to which the disposition is entirely attributable. Microphysical reductionism belongs in this line of thinking:

the fragility of glass, for example, is entirely reducible to its underlying physical, or more precisely microphysical, structure. However, it is possible to maintain a realist thesis independent of (i.e., not grounded in) power. According to this [20–24], power enjoys an ontological independence from both its manifestation and its microphysical structure. It is precisely this hypothesis that we wish to investigate.

According to Molnar [25], there are five characteristics of power. Of these five, it is the first on which we wish to dwell in particular, because it too is attributable to one of the most important notions in the phenomenological tradition, that of intentionality. The fundamental characteristic of power—that which, in other words, distinguishes it *prima facie* from non-power—is directness. Its other characteristics are the following: independence (powers are ontologically independent of their manifestations), actuality (powers are "fully actual properties of their bearers"), intrinsicality (powers are intrinsic properties of their bearers and not attributable to a relationship with something external), and objectivity (powers are endowed with an objective existence and are not mere projections of something else: for example, microphysical structure). Lastly, for Molnar all powers have a causal basis. All the characteristics listed here aim to emphasize the autonomous, independent—i.e., not derived—character of power.

Ontological priority, according to this theory, belongs not to determination but to power, not to invariance, but to force [26–28]. Among the five points, the first is the most significant, since it aims at highlighting what power might actually be, while all the others aim at consolidating the meta-ontological characteristics of power.

Power is essentially connoted by directionality: that is, by being directed towards something. The allusion to the traditional (in particular, Brentanian) notion is explicit. Intentionality in the phenomenological tradition is characterized by three fundamental theses. According to the first, intentionality is directed towards something beyond itself, the so-called intended object. We have seen how examples of intentional phenomena are representing, judging, hoping, desiring, etc., and each of these acts tends to, or is directed towards, something in a specifically relevant sense: in representation something is represented, in judging something is judged, in hoping something is hoped for, in desiring something is desired, and so on. The second thesis is the independence of intentionality from the existence of the intended object. While a non-intentional relationship (like riding a horse, being shorter than Pietro, dropping a book) subsists between two entities only if both of them exist, the intentional relationship holds independently of the existence of the intended object. I may be afraid of encountering the abominable snowman, see an oasis in the desert, hope for the discovery of the fountain of youth, independently of these entities' existence. The third thesis concerns the partiality and perspectivability of the intentional relationship. Being intentionally addressed towards an object means not only determining the intended object, but also the way in which it is intended. If this way is different, the same object may turn out to be different: I may be afraid of the man who keeps telephoning me and not be afraid of my next-door neighbor; Oedipus may despise the man he killed on the road to Delphi without despising his father Laius, or hate Laius's murderer without hating himself, or desire Queen Jocasta without desiring his own mother. Intentionality, to use Nagel's words, is not a "view from nowhere", a "naked" perception of the object, but a perspectival slant on things. It is not in principle possible to perceive, imagine, judge, feel something without incorporating a point of view. Furthermore, intended objects can be fuzzy—that is, indeterminate—objects. For example, I may perceive something in a vague way, as when I hear an indistinct noise or see a figure without identifying its outlines. The classical theory of intentionality maintains two further theses, which frame the three theses listed here. According to the first, intentionality constitutes either a criterion for demarcation between psychic and physical phenomena [29] or else the essential characteristic of consciousness [30]. The second interprets intentionality as closely connected to representational activity. The principle according to which "Every act is representation or founded on a representation" is considered by Husserl, and before him by Brentano, as a founding thesis of phenomenological investigation.

It is precisely these last two theses which are diminished in the proposition of physical intentionality. Indeed, this is not essentially bound to consciousness and has no representational structure. The general frame in which to locate intentionality turns out to be profoundly modified and yet—and indeed in this resides the theoretical relevance of the theory of physical intentionality—the three theses which define the concept of intentionality are maintained. Physical intentionality is also in fact directed towards something. The intentional object of a physical power (such as solubility or electromagnetic charge) is its manifestation.[4] The nexus between power and its manifestation, like the nexus between perception and perceived, is not contingent. The second characteristic of psychic intentionality is also traceable back to physical intentionality. The latter holds irrespective of its existence or non-existence. Something may be soluble without ever being dissolved, or fragile without ever breaking. The manifestation of physical power may exist or not without detriment to the existence of the physical power itself. The third characteristic, the vagueness and indeterminacy of intentionality, also holds in the case of physical intentionality [31]. Just as men have heights although one can think of them not in terms of their heights, so bearers of powers have their locations, although their having the power is not dependent on their having the specific locations they have. Physical powers can also have fuzzy objects. For example, the propensity of unstable elements to decay is indeterminate as to timing.

The identification between property and power and between psychic intentionality and physical intentionality profoundly transforms the distinction between primary and secondary properties. Dispositional properties or powers are not identified with their primary properties, nor derive necessarily from them. As we have seen, we may adopt a reductionist perspective and identify the dispositions with underlying physical structures. But we may also quite plausibly adopt an antireductionist perspective and consider the powers as totally *groundless*: that is, ontologically independent of non-powers. This position renders the powers autonomous and primary with respect to what is traditionally held to be primary: that is, extension, figure, motion—in a word what is measurable. This position has many consequences, first of which is the priority of time (understood not as succession—spatialized time—but as duration, or as history) over extension. From this perspective, time is not a lack compared to stability and fixity (invariance in variation), but is efficacious or creative (stability or continuity in variation); it has, in fact, power.

Dispositional properties or powers are not identifiable with secondary or qualitative properties, nor reducible to them, even partially. In this case, too, there are two strategies we could adopt. According to the first, powers and the qualitative/categorical dimension are two sides of the same coin [22]: that is, "a power is only a face/facet/side of a property that also has a qualitative face/facet/side" [25] (p. 159). According to this theory, all properties have something about them that is irreducibly and ineliminably dispositional, and something else about them that is irreducibly and ineliminably non-dispositional or qualitative in the categorical sense. In this case there is a temptation to think of the qualitative/categorical and the dispositional as 'parts' or 'aspects' of the single underlying property. But we can also argue that when we think of a property as a qualitative/categorical concept[5] we are not thinking of a part or an aspect of the property, but are thinking of the whole property *in a certain way*. Equally, to think of the property as a dispositional concept is not to think only of an aspect of the property but again to consider the whole property in a certain different way [33,34].[6]

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[4] "Of the many ways of characterizing a power, the only one that reveals the nature (identity) of the power is the characterization in terms of its manifestation" [25] (p.63).

[5] Borrowing a useful idea from Lowe [32], we can say that qualitative/categorical properties are *occurrent*.

[6] A good example of this idea is the case of the Gestalt shift, as in the example of the famous ambiguous figure which can be seen as a duck or a rabbit. When we consider the figure as a rabbit or as a duck we are not considering only a part or an aspect of the figure. Rather, we are considering the whole figure in a certain way. Similarly, referring to the famous example of Frege, Hesperus and Phosphorus are identical with Venus. The concept 'Hesperus' and the concept 'Phosphorus' are genuine entities which are identical with each other and also with Venus, just as both dispositional properties and qualitative/categorical properties are genuine entities that are identical with each other [35,36].

However, there is a further possibility: that powers are considered as neither different aspects nor different modes of the same thing. From this perspective, which we can call neutral and monistic, disposition or power is the only reality and the qualitative/categorical dimension is not an aspect or a certain mode of an underlying, whole property, but the only true, vital dimension [37,38].

5. Conclusions

Conceiving of disposition not as invariance in variation but as power means placing the emphasis not on the concept of determination or of data (the qualitative/categorical dimension) but on the concept of force (forceful qualities) and giving priority not to space (extension, figures, size) but to time understood as duration, or as history [39–42]. The concept of physical intentionality is the theoretical instrument which permits this shift and, with it, a profound revision of the distinction—one of enormous relevance and wide range in science as well as in philosophy—between primary (objective, independent, essential) properties and secondary properties (which are subjective, dependent of the subject, inessential). Physical intentionality maintains the essential characteristics of mental or psychic intentionality: directionality, perspectivity, background, and vagueness. But it profoundly transforms the meaning of these notions, since it does not tie them more closely to the concept of representation nor to the more general one of psychic state. In this reversed sense, as it were, of the concept of intentionality, the notion of background assumes special significance, together with those of vagueness and indeterminacy. The concept of background presupposes a spatial declination (the vague horizon against which an object stands out) but also a temporal declination (the background, memory, understood not in a subjective sense but in the objective sense of what is withheld in our life, by our past and also by the past of the species, by the animal—even vegetable—past). In the second volume of the *Ideas*, Husserl refers to a "dark background"[7] far distant from the attentional present, which nevertheless constitutes the foundation of experience, especially the bodily kind. In this sense, his traditional objectifying attitude, which indicates an undiscussed priority of the theoretical attitude, is moderated by the acknowledgement of the fact, fundamental for introducing a possible phenomenology of the unconscious, that the objectifying attitude is founded on a terrain of passivity, precategoriality, pregivenness, a terrain which Husserl does not hesitate to call 'confused'.

Now it is precisely such a background, understood as a subcategorical dimension, which assumes a central importance in the concept of physical intentionality and, more generally, of disposition, with the static interpretation of this concept, as invariance in variation, replaced by its genetic and evolutionary interpretation as temporal duration.

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[7] "This realm includes 'sensibility, what imposes itself, the pre-given, the driven in the sphere of passivity. What is specific therein is motivated in the obscure background" [43] (p. 234).

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