

# *Concepts as representations and as rules*

Giovanni BONIOLO

Università di Padova

## **Abstract**

In this paper a post-Kantian theory of scientific concepts is proposed. In particular, by differentiating the representational level, the intentional level and the real level, it is argued that a scientific concept has to be understood both as a representation and as a rule.

## **1. Introduction**

“What is a concept?”: hard and *vexata* question! If we looked at the history of philosophy, we would find a great deal of possible answers. We should arm ourselves with good will and patience and then start tasting all of them, one by one, in order to find the best one, the one that best satisfies our own personal philosophical feeling. Yet, since there could be so many possible answers, nobody could consider all of them, at least before reaching a point (death) after which they – as all the products of the human mind, and the human mind itself – lose any value. Since I fear this, I do not enter such a historical question. However, the view that I am proposing is connected by means of a strong red *Leitfaden* with the Kantian notion of concept “refurbished” by E.Cassirer in his masterpiece *Substanzbegriff und Funktionsbegriff* (1910)<sup>1</sup>.

Therefore in what follows, I will try to offer a post-Kantian theory of scientific concepts. In particular I will propose a position according to which

---

<sup>1</sup> A historical reconstruction of this red *Leitfaden* is given in G.Boniolo, *Metodo e rappresentazioni del mondo. Per un'altra filosofia della scienza*, B. Mondadori, Milano 1999.

a concept has to be understood both as a representation and as a rule. In order to achieve this result, I will differentiate three levels: the representational level, the intentional level and the real level.

Though it is not my aim to replace philosophers of language, or to adopt a linguistic analysis, I will start off from language, in particular scientific language, since it has a very important role in the formation and communication of theoretical and experimental scientific results. It is by means of language that scientific views – which are constructed by appropriately putting together concepts in judgments – can be made intersubjective, can be grasped by anybody, and, thus, can be judged. Language, as Cassirer pointed out, is a third element that makes the relations between mind and world objective. It expresses the way by means of which both the former constitutes the latter as an object of knowledge, and the latter acts back on the former by correcting its products.

Right from of this start, it should be clear that I will not get into the difficult quandaries concerning the relations between thought and language. In particular I will venture neither on the problems concerning the possibility that the former exists without the latter, nor on those of priority. Actually I wish to begin my proposal from something which, I believe, can hardly be disregarded: *there is an isomorphism between language and thought, in the sense that everything which can be thought can be said, and everything which can be said can be thought*. This isomorphism holds at least for the intersubjective mental products; but these are the only which matter here, since we are dealing with science. Nevertheless, one should not disallow the possibility that there are products – such as the subjective images of objects – which cannot be linguistically represented, otherwise they would be objectivated and, thus, they would vanish. However, for the aims of my proposal, this aspect may be overlooked.

In conclusion, it is not my purpose to assume a given theory of mind, a given theory of language, or a given theory of the relations between mind and language. Instead, taking (rather instrumentalistically) the isomorphism between mental products and elements of scientific language for granted, I will move from the latter to understand the former (or, rather, a class of the former). That is, something like the way indicated by Aristotle, of course without the Aristotelian metaphysical commitment:

“... to start from things which are more knowable and obvious to us and proceed towards those which are clearer and more knowable by nature; for the same things are not ‘knowable relatively to us’ and ‘knowable’ without qualification. So in the present inquiry we must follow this method and advance from what is

more obscure by nature, but clearer to us, towards what is more clear and more knowable by nature” (*Phys.*, I, 184a 16-22).

However, it is worth noting that the isomorphism between language and thought cannot be extended to the world. This should not be understood in the sense that the world contains more or (*aut*) less than what is contained in thought, but in the sense that *the world contains more and less at the same time*. It certainly contains less since many mental products (for example those of Myth, of Literature, and even some scientific ones) have no existing referent, or they may be found out not to have one. It certainly contains more since, had each thing, or each relation between things, a corresponding mental product, knowledge could not grow, and this is not the case.

In conclusion, it is sufficient to instrumentalistically accept that there is an isomorphism, which will be made clearer on the way, between thought and language, or, rather, *between linguistic scientific representations and corresponding mental representations*. The former should be interpreted *à la* Cassirer, that is, such as the intersubjectively communicable symbolic translations of the latter. Because of this assumption, the first question to be answered is: what are the minimal elements that a scientific linguistic representation has to have?

### *Terminological remark*

Before starting, a terminological note must be made. In English, the term ‘entity/ies’ directly derives from the Latin verb *esse* (to be), instead the term ‘being/s’ directly derives from the English verb *to be*, that, as said, corresponds to *esse*, and, therefore, it indirectly derives from *esse*. The Latin translation of the term ‘being/s’ is *ens/entia*, which, of course, directly derives from *esse*. In what follows, instead of using ‘being/s’, I will use the Latin term ‘ens/entia’. In this way, I establish again in a direct way the etymological correlation between the couples ‘ens/entia’ and ‘entity/ies’, the different sense of which will be clarified later.

## **2. Linguistic representation and mental representation**

If we analyse any scientific linguistic representation, we recognize that it contains expressions which have to do with individual entia: ‘Moon’, ‘Jove’,

‘ether’, etc. Others have to do with collections of entia: ‘planet’, ‘electron’, ‘adron’, etc. But this is not enough. Scientific linguistic representations contain also expressions that allow us to speak in terms of properties which seem to belong to the entia indicated by the just mentioned expressions: the electron is said ‘to have a charge’, the glass ‘to be fragile’, the body ‘to be massive’, etc. Furthermore, there are expressions which allow us to treat the relations between entia: A ‘is heavier’ than B, A ‘is a less efficient conductor’ than B, etc.

Let us stop for a while to consider if there is a difference between ‘property’ and ‘relation’. Is it true that properties are something “intrinsic” (in whatever sense you want) to the ens possessing them, whereas relations are something “extrinsic” (in whatever sense you want)? Let us reflect on the following passage from Helmholtz:

“Actually each property or quality of a thing is nothing but its capacity to act to produce certain effects on other things [...] We call such an activity a property when we hold the reagent, on which it works, in mind as self-evident without naming it. Therefore we speak of the solubility of a substance, that is its reaction to water; we speak of its weight, that is, attraction for the earth; and with the same justification we call it blue, since we thereby presuppose as self-evident, that we are merely concerned with defining its effect on a normal eye. However, if what we call a property always involves relation between two things, then such an action naturally never depends on the nature of one of the agents alone, but always exists only in relation to and in dependence upon the nature of a second ens, on which the effect is exerted”.<sup>2</sup>

By meditating on this passage, we realize that also properties may be considered as relations, even if relations of a certain kind. The ens E which is said to possess the property P may be thought of as an ens which is in a given relation with the catalyst ens E’, that is, with an ens that, in certain well-determined empirical situation, permits us to detect the property P possessed by E. From this point of view, the property P is no more something “intrinsic” to E, but something which emerges by putting in a particular empirical relation E and E’. While the presence of E’ is clearly emphasized at the empirical level (P could not be detected without E’), E’ may be neglected at the theoretical level. Exactly here we may find the cause of the wrong idea that P is something possessed by E independently of anything else, that is, something completely un-relational. The electron is said ‘to be charged’,

---

<sup>2</sup> H. Helmholtz, ‘Die neuen Fortschritte in der Theorie des Sehens’ 1868, now in H. Helmholtz, *Vorträge und Reden*, Braunschweig 1896, pp. 321.

that is, it possesses the property  $P = \text{'being charged'}$ , but this does not mean that this is a non-relational property. Actually, being charged is something detectable only when the electron enters a relation with another ens of a particular type, i.e., the catalyst ens, for example, a proton, an ion, a current. At the empirical level without such a proton, ion, current, there is no reason to claim that the electron is charged. Nevertheless, we may neglect such a proton, ion, current at the theoretical level.

Therefore, instead of speaking of properties and relations as two different things, it would be better to speak of *implicit (relational) properties* and *explicit (relational) properties*. That is, the *implicit (relational) property*  $P$  of an ens  $E$  is what emerges from putting in a well-determined empirical relation the ens  $E$  with a well-determined catalyst ens  $E'$ , whose presence is necessary at this level even if it may be negligible at the theoretical level. Instead, the *explicit (relational) property*  $P$  of an ens  $E$  is what emerges from putting in a well-determined empirical relation the ens  $E$  with a well-determined catalyst ens  $E'$ , whose presence is necessary both at this level and at the theoretical level.

However, from now on, I will simply use 'property' both for the implicit (relational) properties and for the explicit (relational) properties.

Coming back to the expressions mentioned before, we have to do with expressions related to individual entia, expressions related to collective entia and expressions related to properties. Of course, these three classes are not sufficient, since a scientific representation is not a mere juxtaposition of elements belonging to them. It is rather something in which entia and their properties are connected through propositions. In fact, it is possible to speak about entia and their properties in at least four different ways. It is possible to speak about:

- 1) properties possessed by collections of entia: "All protons are adrons", "All quarks are confined", "All moving magnets cause a current in the close conductors";
- 2) properties possessed by individual entia: "The Moon is not a radioactive source", "Mars has a mass which is about 0.11 times the Earth's";
- 3) properties possessed by singular entia belonging to classes of collective entia: "This body has a mass of 8 Kg", "This conductor has a resistance of 5 Ohm"; "The magnet on the blue table generates a field stronger than the one generated by the magnet on the red table";
- 4) existence of some individual ens and some singular instances of collective entia: "There is a planet which has a diameter of 6780 Km", "There is

a magnetic single pole”, “There exist a 3 meters long body”, “There exist a 4 Mev particles accelerator”.

At this point we may be satisfied, since we have all we need in order to construct a (minimal) scientific linguistic representation. That is, we have: expressions about individual and collective entia, non quantified or quantified (in an universal or existential way) expressions speaking of entia and properties.

As said, these classes belong to the linguistic (and, as such, intersubjectively communicable) side of an isomorphism, the other side of which is made of mental products, in particular mental representations. As a consequence, there is a correlate mental product (that is, a concept and a judgment) for each class of linguistic expressions. That is, concepts correspond to the expressions relative to individual and collective entia; non-quantified and quantified judgments correspond to non-quantified and quantified propositions. However, let us put aside judgments and limit ourselves to concepts.

Some may be surprised by the presence of concepts of individual entia. However, after a short and intuitive reflection, this fact will not seem so bizarre. Also Frege showed that there may be concepts under which an only one object falls.<sup>3</sup> In the perfect language, which does not disguise thought, there are unsaturated expressions like ‘x is no other than Venus’, whose referent *à la* Frege is precisely that concept having an extension with only one object, that is, the planet Venus. On the other hand, nobody questions the existence of concepts with infinite extensions: ‘man’, ‘dog’, ‘potato’, etc. Nobody questions the possibility of concepts with finite extensions either: ‘the planets of the solar system’, ‘the flowers of John’s garden’, ‘the stars of the Milky Way’, etc. In this case, the cardinality is given by  $n$ , finite number. Yet, I hope, nobody would be keen to suggest that  $n$  must necessarily be greater than 1. Do we really want to eliminate  $n=1$  or  $n=0$ ? Yes, do you? For what reason? Nevertheless, a problem arises: in what sense can we speak about universality in the cases of concepts having unitary or empty extension? This question should remain unanswered for now: before dealing with it I shall make some other steps.

However, now is the right time to express my thesis and argue for it. Actually I will proceed by presenting and discussing a chain of partial theses. This means that only at the very end the theoretical frame will become clear.

---

<sup>3</sup> G. Frege, ‘Über Begriff und Gegenstand’, 1982, Engl. transl. ‘On Concept and Object’ in P. Geach, M. Black (eds.), *Translations from the Philosophical Writings of Gottlob Frege*, Blackwell Oxford, 1952-1993<sup>3</sup>, pp. 42-55.

### 3. Concepts as representations and as rules

*Thesis I:*

*A linguistic representation has an indirect sense; instead, a mental representation has a direct sense.*

The linguistic expression is only the physically communicable side of a mental product. I do not mean that there is something really existing in the mind or anywhere else – in a sort of third realm – which the mind may somehow grasp. I mean that *there is a mental act, the result of which is a concept or a judgment, that is, a cognitive synthesis*, a representation. The analysis of the former (the mental act) has to do with psychology; the analysis of the latter (the products of the mental act, i.e., concepts and judgments) has to do with epistemology.

If the linguistic representation is what makes physically communicable a mental representation, we cannot ask ourselves what its sense is. A physical manifestation, such as the motion of the sound waves, or ink structured in a certain way on a sheet of paper, has no sense, unless it is correlated to something that has sense. In the case of the scientific linguistic representation, the physical manifestation is isomorphically correlated to mental products. Thus, only the latter have sense. In other words, sense belongs to the concept and to the judgment, not to the corresponding linguistic expressions, which are only physical means to intersubjectively communicate the former.

Of course, we may say that a physical sign has a sense, but only in an indirect way, that is, in force of the fact that it is the sign of some mental product. In conclusion, sense has to do with the mental representation directly and with the linguistic representation indirectly, since the latter is the isomorphic physical correlate of the former.

*Thesis I':*

*A linguistic representation has an indirect referent; instead, a mental representation has a direct referent.*

The argument for this statement is on the lines of the previous one. A physical sign does not refer to anything, unless we have constructed it (or we interpret it) in a way such that its isomorphic mental correlate refers to something. Thus, the referent is directly concerned with the mental representation and only indirectly with the linguistic representation, the latter being a phy-

sical isomorphic correlate of the former. In other words, again, the referent has to do with the concept and the judgment, that is, with the products of mental acts, not with their linguistic expression.

Thus, it is the concept and the judgment that have sense and referent. Moreover, their physical manifestation is given by their linguistic correlates. These will in turn have an indirect sense and indirect referent, *precisely for the reason that they are the physical isomorphic correlates of the former.*

*Thesis II:*

*Concepts are representations and rules*

Two aspects need to be distinguished, to prevent psychologism about concepts: 1) the *mental act* (in traditional terms, the apprehension), which is certainly psychological in nature, and 2) the *product of that mental act*, that is, the concept, which, since it belongs to the mental representation isomorphic to the linguistic representation, is necessarily objective (at least, in the sense of intersubjective).

Thus, I think of concepts along Kant's lines: as a function of synthesis due to a unifying mental act, which allows us to group together several representations under a unique representation. We do not infer from entia what is common, otherwise we should face the problems of the genus-concept. Rather, since the mental act produces the function of synthesis (that is, the concept), it produces what unifies several entia, that is, what will be common among them thereafter. In this way, those entia will fall under the concept that represents them: here it is the notion of *concept as representation.*

Nevertheless, the synthetic mental act does not only produce the representation, but, at the same time, produces the rule which must be satisfied by an ens so that it can be considered an ens falling under that representation. Therefore, at the very moment in which we have the representation, we have also the rule that tells us what has to be represented: here it is the notion of *concept as rule.*

The two aspects are totally inseparable. There cannot be representation of something without a rule that says what can be represented. Vice versa, there cannot be a rule of synthesis without a representation that represents what is synthesized.

Therefore, *the concept may be considered as the representation of what is common to what it synthesizes, and as the rule which identifies what is common.*



Let us take the concept of ‘lepton’. As a representation the concept of ‘lepton’ synthetically represents all the entia which satisfy the rule intrinsic to that representation; namely, all the entia which satisfy the concept of ‘lepton’ as a rule.

Speaking about *concepts as representations* and *concepts as rules* means speaking about two sides (facing two different directions) of the same coin. The concept as representation deals with the referent of the concept (or, indirectly, with the referent of the linguistic expression which physically expresses the concept). On the other hand, the concept as a rule deals with the sense of the concept (or, indirectly, with the sense of the linguistic expression which physically expresses the concept).

*Thesis II.1:*

*The concept as rule is connected to the sense of the concept as such.*

What does possessing a rule mean? Nothing but knowing how to apply it and, thus, knowing what satisfies it; that is, what may be represented by the representation which intrinsically contains it in order to be that representation. Thus, possessing a rule means possessing a concept; in other words, grasping the rule means grasping the concept. However, what is what is grasped when the concept is grasped? It is not whatever that concept stands for, at least not directly. Rather it is whatever that concept expresses, its sense. Only indirectly we grasp what the concept stands for, what it is the representation of; that is, its referent. The concept as rule is connected to the sense of the concept as such.

Let us think about the concept of a collective ens, such as ‘electron’. Actually, we should not speak of the concept ‘electron’ as a rule, but as a *unity of rules*. Grasping the sense of the concept ‘electron’, in fact, requires grasping a set of rules synthesized by the concept as such: “an electron is the source of an electrostatic field”, “an electron is an elementary charge”, “the charge of an electron is  $1,6 \times 10^{-19}$  C”, “an electron has a mass of  $9,1 \times 10^{-31}$  kg”, etc.

In this case, grasping the rules that allow us to grasp the sense of the concept ‘electron’ means grasping Classical Electromagnetism. But can other rules be given? Of course. I could have given some other rules, like “an electron has  $1/2$  spin”, “an electron has a mass of  $0,5$  Me V”, “an electron is a stable particle”, “the anti-particle of the electron is the positron”, etc. In this way, we would still have a set of rules synthesized by the concept ‘electron’,

but such a concept would not have the sense of the previous concept anymore, since they (the rules) would not be given by Classical Electromagnetism anymore, but by Quantum Mechanics.

Thus, the concept 'electron' as a rule is really the unity of the rules synthesized by it, and to grasp that unity is to grasp its sense.

*Definition:*

By 'semanticising area' I mean the set of rules synthesized in a concept which are sufficient in order to grasp its sense.

Changing the semanticising area (for example, from Classical Electromagnetism to Quantum Mechanics) means changing the sense of a concept. Thus, the sense of a concept is not something which belongs to that concept as such, but something which belongs to the whole area which is synthesized in that concept, exactly when this is produced and grasped.

Possessing several different semanticising areas is grasping several different senses of the same concept. Not only. The wider a possessed semanticising area is, the wider the sense of the possessed concept is.

Let us suppose that we do not have any semanticising area to allow us to grasp the sense of the concept 'daturine'. We may remain in that cognitive state, that is, we would never know what 'daturine' is. Let us suppose, instead, we know that daturine is contained in some plants, the daturas, and that it is an alkaloid. Now we have an extremely narrow semanticising area, since we know, more or less, what 'to be contained in plants' and 'alkaloid' mean. In this case, we can already claim that we have grasped the concept of 'daturine', even if in an extremely poor and shallow way. In order to grasp that concept in a richer and deeper way, we should acquire some rules of the chemistry of alkaloids, for example.

Similarly, if we can associate the concept 'ammonia' to a semanticising area containing rules such as "ammonia is soluble in water", "ammonia is used in refrigerators", we can already say that we have grasped something of its sense. However, we can enlarge that semanticising area, and thus enlarge the sense of the concept, and come to possess rules like "the chemical formula of ammonia is  $\text{NH}_3$ ", "ammonia is a gas", "ammonia liquefies at  $10^\circ \text{C}$  of temperature and at 6 atm of pressure", "ammonia combines with acids and originates ammoniac salts". Therefore,

*Corollary:*

*Possessing different semanticising areas means grasping different senses of the concept having the same name. Possessing wider and wider semanticising areas means grasping more and more deeply the sense of the same concept.*

These remarks are meant to stress that not only the semanticising area is not unique, but it may not even be something well limited or limitable, especially in the cases of every day concepts. The limits of a semanticising area are mostly subjective limits, in the sense that each individual has his own particular extensions of a given semanticising area. From this point of view, the aim of teaching is precisely that to try to standardize semanticising areas, to propose new ones, and to enlarge those which are already possessed.

By taking into account what has been said about the semanticising area, it follows that I am proposing a holistic theory of sense, where the holism is limited to such a semanticising area. That is, I am proposing a “limited” holistic theory of sense.

*Thesis II.2:*

*A concept as representation is connected to the referent of the concept itself.*

Whereas the sense of a concept is connected to the fact that the concept is a unity of rules, its referent is connected to the fact that it is a representation of something different than itself, that is, representation of its referent.

*Thesis III:*

*Every concept refers intentionally to an ens.*

Each representation qua representation is representation of something different from itself, in particular it is a representation of its referent, even if it is not given that each referent is something existent. That is, not each referent is a *real referent*: there is also the non-real referent, which I call *intentional referent*, for what I am going to say.

At this point, a question arises: what is the status of that something which the representation intentionally refers to? Does that something really exist in the mind? Is it the image of something really existing outside the mind?

Let us dwell upon the first question emphasizing that always attributing an existence to what is represented is a source of misunderstandings and errors. With reference to this point, we have to very carefully distinguish two terms: ‘ens’ and ‘entity’.

*Definitions:*

1. By ‘ens’ I have meant, and I will mean, anything having some determinations which distinguish it precisely as such, that is, anything having an essence – to which I attribute only logical-epistemological value, but not metaphysical value, as I shall show.

2. By ‘entity’ I will mean the ens which also exists. Thus, existence is not a necessary determination of entia, and, therefore, not all entia are existing entia, that is, entities.

According to this distinction, that something which is intentionally represented by a mental representation is not an entity, but an ens, that is, an *intentional ens*, which, as such, cannot have existence.

About the second question, for now I want only to note that an image, *à la Frege*, is something subjective, something belonging to the subject and, thus, steeped in its subjectivity. On the contrary, the intentional ens, as we shall see, is completely objective and, thus, something completely different from the image (*à la Frege*).

After these points, it is worth noticing that I am introducing the possibility of speaking about non-existing entia and thus I am going to stigmatise a prejudice about the existing and to state a principle.

*The fallacy of the prejudice about the existing must be avoided.*

The prejudice about the existing is due to the fact that we do not realize that the set of what exists, or existed, or will exist, has only a (non empty) intersection with the set of the things that we can know. There are both existing entia which we do not know yet and entia which we know, but which do not exist. We do not know only bar counters, bendable seats, slicing machines, grapes, electrons, molecules, which exist, existed or will exist. We know also luminiferous ether, phlogiston, the Seven Dwarfs, Ulysses, Nausicaa which never existed, do not exist now, and will never exist in the future. Reducing all knowledge to what was, is, or will be empirically known, or

knowable, amount to unwarrantedly forgetting several constructions of the human mind which could not, cannot, or will never be empirically known, or knowable.

I will skip the (neither trivial nor marginal) problem concerning what empirically knowable means, since this is not the problem in question. Instead, it is worth asking: should we really constrain our knowledge to what is empirically knowable? Should we eliminate fantastic entia or mythical entia? Do we not know Snowwhite, Ulrich the man without qualities, the hippogriff, Chiron the centaur, Apollo, etc.? Should we eliminate physically, or logically impossible entia? Do we not know the golden mountain, fused ice, etc., the circular square, the convex concave, etc.?

Here we have to make clear what 'to know' means. Surely, '*to know*' is not synonymous of '*to know empirically*'. Claiming that would mean supporting a *positivistic parody of the worst positivism*. In particular, had one to object on the grounds of that identity, one would constrain the realm of knowable to what is empirically knowable: but in this way one jeopardizes ones own possibility of cognitively speaking about what will never exist, and also about what might be discovered to exist in the future.

However, should the use of 'to know' also in the cases of entia be disturbing, we could distinguish between *intentional knowledge* (referring to entia) and *empirical knowledge* (referring to entities).

After stigmatising the prejudice about the existing, I go on to formulate the

*Principle of independence of essence from existence:*

*The fact that any ens has individual and well-defined determinations (i.e., an essence) is completely independent of its existence.*

Basically, this principle summarizes something already claimed. We may know essences, without having anything to do with their possible existence. In other words, intentional knowledge is completely independent of empirical knowledge.

*Thesis IV:*

*Not every concept refers to an entity.*

Since it is a mental representation, every ens-concept intentionally represents an ens, and, if the ens in question is existing, it also represent an entity;

but if that ens is not an existing ens, then the concept will not represent an entity. Therefore, if we want to avoid the traps of the prejudice about the existing, anytime we speak about a referent we should make clear if we are meaning what is indicated and really exists (the entity), or if, on the contrary, we are meaning what is simply indicated (the ens). In the first case, it will be a *real referent* of an expression, and there will be something existing represented by it. In the second case, it will be an *intentional referent*, and what is represented does not have existence. Thus,

*Corollary:*

*Every representation has an intentional referent, but not all representations have a real referent.*

Let us start off from concepts of collective entia. Let us consider the concept of 'planet'. It certainly has an intentional referent, that is, the intentional ens 'planet' which I may know intentionally. However, there is no real referent, since there is no ens 'planet' which may be empirically detected. Here a misunderstanding might arise: *there is a particular planet*, in the sense that a particular planet exists, *but the planet does not exist as such*. Thus, every concept of a collective ens has an intentional referent (someone calls it *absolute object*), which is the intentional ens that it represents, but it does not have a real referent, since real referents are always individuals.

On the other hand, a singular concept of ens, which is obtained by making a concept of collective ens particular, may have a real referent. Of course, it always has an intentional referent. For example, the concept 'this electron' (which is obtained by making the collective ens-concept 'electron' particular) has an intentional referent (which is the intentional electron in question), but also a real referent: the existing electron that we are referring to.

The same analysis may be made in the case of individual ens-concepts. For example, the individual ens-concept 'Chiron the centaur' may have only an intentional referent, since there is no real ens corresponding to Chiron the centaur; the individual ens-concept 'Venus the planet', instead, has both an intentional referent and a real referent (the real ens corresponding to Venus the planet).

*Thesis V:**The property-concepts is epistemologically prior.*

In giving an example of the way in which the sense of a concept is given by means of the rules of its semanticising area (rules which are synthesized by the concept itself, since it is the unity of rules), I have claimed that the sense of the concept ‘classical electron’ is individuated by the rules “an electron is the source of an electrostatic field”, “an electron is an elementary charge”, “the charge of an electron is  $1,6 \times 10^{-19}$  C”, “an electron has a mass of  $9,1 \times 10^{-31}$  kg”, etc. After an examination of these judgments, we may note that to grasp the sense of the concept ‘classical electron’ we need to master the senses of property-concepts such as ‘being an elementary charge’, ‘being the source of an electrostatic field’, ‘having a charge of  $1,6 \times 10^{-19}$  C’, ‘having a mass of  $9,1 \times 10^{-31}$  kg’, etc. Thus, grasping the sense of an ens-concept amounts to grasping the correlated semanticising area, that is, the properties contained in that semanticising area. Therefore, since properties are attributed in judgments, it amounts also to grasping the judgments belonging to the same semanticising area.

In conclusion, grasping the sense of the ens-concept may involve different things, according to what we want to emphasize. It may mean:

- 1) grasping the semanticising area in which that concept is contained (emphasis on the holistic sense);
- 2) grasping the rules belonging to that semanticising area (emphasis on the concept as rule);
- 3) grasping the properties possessed by that ens, in accordance with those rules belonging to that semanticising area (emphasis on properties);
- 4) grasping the senses of the judgments with which property-concepts and ens-concepts are associated and, thus, with which the rules belonging to that semanticising area are associated (emphasis on the judgment as explicitation of a rule).

As we have seen, grasping the sense of a concept involves also the individuation of its referent; then, grasping property-concepts which are predicated of that particular ens-concept in that semanticising area, involves the individuation of the referents of ens-concepts by means of the referents of property-concepts (i.e., the properties possessed by the denoted ens). Furthermore, since there are intentional referents and real referents, there will also be *intentional properties* (possessed by intentional entia) and *real properties* (possessed by real entia).

From an epistemological point of view, the distinction between real and intentional properties is very important. The intentional properties possessed by intentional entia are determined by the semanticising area which those ens-concepts and those property-concepts belong to. Instead, real properties are empirically detected, and thus determined, by means of experiments. Therefore, what allows us to know those aspects of an ens which are real aspects (beside their being also intentional aspects) is given exactly by the real properties. This does not amount to asserting that real properties are inferred from experience; rather, experience allows us to control if the conjectured intentional properties are also real properties.

Thus,

1) grasping the property-concepts of a semanticising area means grasping the ens-concepts belonging to that area;

2) knowing the intentional referents of the property-concepts means knowing the referents of ens-concepts which possess those intentional properties;

3) knowing the real referents of the property-concepts means knowing the real referents of the ens-concepts which possess those real properties.

Therefore, *I intentionally know an intentional ens exactly because I know the intentional properties which it possesses*. In other words, the intentional ens is given by the intentional properties which it possesses, it is a *knot of those properties* and its corresponding ens-concept synthesizes (as the unity of rules) exactly those properties. Hence,

*Corollary:*

*An intentional ens is a knot of intentional properties; a real ens is a knot of those intentional properties which has been empirically detected to be also real properties.*

This is the reason why I claim the epistemological priority of property-concepts, and thus the epistemological priority of their referents (i.e., properties).

*Thesis VI:*

*Only the singular real properties of entities can be empirically detected, but not entities as such.*

When I have mentioned real properties, I have said that they are what allows us to speak about the reality of the entia which posses them. But, of



course, we can empirically detect only individual properties of the entities, not entities as a whole. We claim that we detect entities only in an erroneous and mystifying way. There is no experimental apparatus that allows us to detect entities in their completeness. Actually, we detect that an entity is lucid, transparent, acid, radioactive, heavy, electrically charged, that it has spin  $1/2$ , etc. *The real ens that we empirically know is exactly the knot of the real properties that we can empirically detect, one independently of the other.* Furthermore, and we should keep this in mind, it is not necessarily true that all intentional properties are real properties as well. Only those which we can identify by means of an experimental apparatus are real. This means that the physical reality that we can talk about may only be given by the properties that we can directly, or inferentially, detect. Once more, these are the only ones that we know empirically.

From the point of view proposed up to now, many problems may find a satisfying solution, as may be seen by answering some objections that could have arisen when I introduced intentional entia.

*Objection I:*

*What does knowing an intentional ens mean, or what does knowing intentionally mean?*

I repeat: the knowledge of an intentional ens is the knowledge of its intentional properties, and it is precisely the knowledge of the intentional ens which makes the knowledge of the real ens possible. We can empirically know real properties (i.e., we can scientifically know the world around us) because we have conjectured their real existence, that is, because we have constructed an intentional ens which possesses intentional properties which cognitively constitute the corresponding hypothetical real properties.

*Objection II:*

*Is the introduction of intentional entia really necessary? In this way, do we not multiply ontology?*

Certainly, the introduction of intentional entia causes the enlargement of the ontology, but such an enlargement is necessary, at least for two reasons: one has to do with knowledge in general, the other with scientific knowledge. Had we not introduced intentional entia, how could we accounted

for the possibility of knowledge of entia which are not, or could never, be real? Let us think about Diana, goddess of hunting. She is not a real ens, nevertheless I know her: Diana is a knot of intentional properties which are the intentional referents of property-concepts contained in the semanticising area which is provided by Classical Mythology. In fact, some anthropometrical properties, some amatory properties, some athletic properties, some kinship properties may be attributed to Diana. In the same way, Pegasus, the Seven Dwarfs, Moby Dick, and Captain Achab are intentional entia since they are knots of intentional properties, that is, since they are intentional referents of property-concepts belonging to mythological or fantastic semanticising areas. What about W.v.O. Quine's 'round-squared cupola of Berkeley College', the 'concave convexity', the 'golden mountain', the 'boiling ice'?<sup>4</sup> Do we not know these entia, indeed? I claim we do, at least in the sense of intentional knowledge, since we know the intentional properties which they possess and which may well be inconsistent. In conclusion, we can know them since they are the intentional referents of the ens-concepts of which the property-concepts, that refer to the properties possessed by them, may be predicated. I may grasp the sense of these odd concepts because I grasp the semanticising area which they belong to. Are these entities? Certainly not, but this is a different problem altogether. Only if we admit the possibility of intentional entia can we account for the (intentional) knowledge of fantastic, poetic, mythological and even physically and logically impossible entia.

On the other hand, intentional entia are also needed for scientific knowledge, since it is precisely science which puts possible real entia in a sort of limbo of existence. As I said before, first we construct intentional properties by constructing property-concepts denoting them, and *then* we check if those properties are real as well. In this way, though, one constructs an intentional ens, and leaves the possibility that there is also a real correlate undecided. In this way, the entity is constituted for empirical knowledge. In a sense, the construction of an intentional ens by means of its concept (i.e., by means of the property-concepts which can be predicated of that concept) is a condition for the possibility of the empirical knowledge of the real ens, which is thus constructed.

### *Objection III:*

*What is the essence of an ens?*

---

<sup>4</sup> W.v.O. Quine, 'On what there is', 1948, now in W.v.O. Quine, *From a logical point of view*, Harvard University Press, Cambridge (Mass.) 1980<sup>2</sup>, pp. 1-19.

In order to answer this question, we should recal Kant's passage:

"[...] however, we must in no way think of the *real* or *natural essence* of the things, into which we can never gain insight. For since logic abstracts from all content of cognition, consequently also from the matter itself, only the *logical essence* of things can be under discussion in this science. And into this we can easily have insight. For to the logical essence belongs nothing but the cognition of all predicates in respect of which an object is determined by *its concept*; the real essence of the things (*esse rei*), on the other hand, requires the cognition of those predicates on which depends, as determining grounds, everything that belongs to its existence. If, for example, we want to determine the logical essence of a body, we do not have to search out the data for this in nature; we only need to direct our reflection to those characteristic which as essential elements (*[nota] constitutiva, rationes*) originally constitute its basic concept".<sup>5</sup>

Here, Kant emphasises the distinction between *logical* (but we should rather say *logical-epistemological*) *essence* and *real essence*: this distinction should not be forgotten. In fact, too often we tend to reduce the term 'essence' to *ousía* in Aristotle's sense. And, of course, this should not be my case. Essence is that something that determines an ens as such, but which is completely independent of its existence. *Essence, once more, is what determines that individual ens qua that individual ens, and not that individual entity qua that individual entity*. Concerning this, let us keep in mind the principle of the independence of essence from existence.

#### *Objection IV:*

*In what sense can we speak about the universality of a concept?*

After warning about the possible misunderstanding of the term 'essence', it is easier to deal with the problem of the universality of concepts, which has been postponed twice: in what sense can a concept having an unitary extension, or a null extension, be considered universal?

In order to find a satisfying solution, we should go back to the scholastic distinction between *direct universal* (*intentio prima*) and *reflected universal* (*intentio secunda*). By 'direct universal' it is meant (and I will mean) precisely the essence of the ens intentioned by a concept. In such a way, that ens has to be considered in itself (in its logical-epistemological essence), inde-

---

<sup>5</sup> I. Kant, *Logik*, 1800, Engl. transl. *Logic*, ed. by R. Hartman and W. Schwarz, The Bobbs-Merrill Company, 1974, p. 67.

pendently of the fact that it distinguishes that particular individual ens and of the fact that it exists here and now, i.e., independently of the fact that it determines a particular individual entity. A direct universal is independent of singularity or multiplicity, and from existence and non-existence as well. On the contrary, by 'reflected universal' (which is the universal in the most common sense) it is meant (and I will mean) what results from reflecting about the relations between a given essence and the act of determining some individual entia as such. In other words, the reflected universal has to do with the relation between an essence and the possible individuals which are what they are because of the fact that they have that essence. Consequently, the reflected universal can be thought of as constituted by an essential content and by the fact that it may be in relation of predicability. In conclusion, it is only the reflected universal which *est aptum praedicari de pluribus*; it is only the reflected universal which is apt to be predicated of a multiplicity.

In conclusion, if one knows this distinction, one should not be particularly surprised when I speak about universality also in the cases of concepts having a unitary or empty extension. In this way, of course, I do not refer to the reflected universality, but to the direct universality. All concepts are direct universals, since they are representations of intentional entia, i.e., of essences. Not all of them are reflected universals, though, since not all of them are predicable *de pluribus*.

As a consequence of this approach, it follows that

*Corollary:*

*From an intentional point of view, no concept is empty.*

It is ambiguous to claim that an empty concept is a concept under which no element falls. In fact, as far as all concepts always refers to intentional entia, then no concept will be empty, since, from an intentional point of view, an intentional ens falls under it. Of course, if we look at the problem from a real point of view, things seem to be different: a concept may be empty in the sense that it may be the case that no entity falls under it. So, one should distinguish while speaking of empty concepts. Is one talking from an intentional point of view? In that case, there are no empty concepts. Is one talking from a real point of view? Then, there may be empty concepts. Let us pay attention to the fact that, from the point of view of direct universality, every concept cannot but always be an unitary concept. From the point of view of reflected universality, on the other hand, it could be empty, unitary, or manifold.

*Explanation of the difference between characteristic and property*

The remarks stressed above open a different way to deal with the ambiguity between the notion of ‘characteristic’ (*nota*) and that of ‘property’, which afflicts the classical theory of concepts. In that view, there is no clear distinction between ‘object’ and ‘concept’, and what the features of each are. However, that ambiguity is latent also in the modern (Kant’s) and contemporary (Frege’s, Cassirer’s) theories, even if in those cases the distinction between ‘object’ and ‘concept’ is clear. Kant does not pay much attention to the notion of ‘property’, even if in his *Logic* he considered the notion of ‘characteristic’, which he took over from the classical tradition and considered under the two headings of partial concept and self-standing concept. In Frege, instead, the distinction between ‘property’ and ‘characteristic’ is becoming sharper, as a consequence of the sharp distinction between ‘concept’ and ‘object’: a property has to do with an object, a characteristic has to do with a concept. However, both a property and a characteristic are still both concepts, actually they may be the same concept considered from two different points of view.

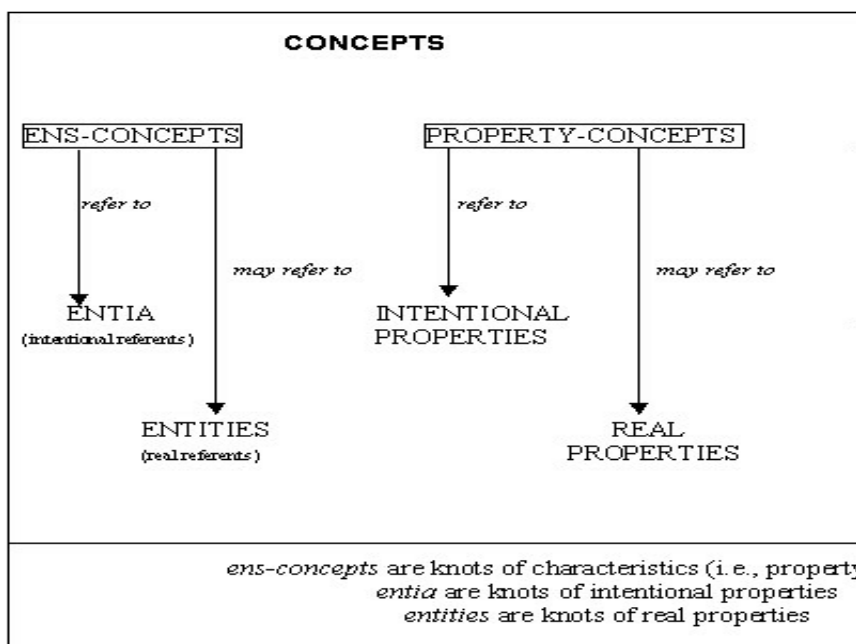
In my proposal, instead, properties and characteristics are two different things altogether. This is due to the distinction between the notion of ‘property-concept’ and that of ‘property’ (interpreted as referent). In this framework, the property-concepts can be predicated of ens-concepts and, thus, *a property-concept is the characteristic of an ens-concept, which then is a concept subordinated to it*. On the other hand, *a property, since it is a referent, is what is possessed by an ens, as a referent of a ens-concept*. So, the characteristic belongs to the representation level, the property to the referent level. In the judgment “magnets attract iron” that double aspect is made clear. On the one hand, the property-concept ‘attracting iron’ is predicated of the ens-concept ‘magnet’, and, thus, the former is a characteristic of the latter, whereas the latter is subordinated to the former. On the other hand, the referents of the concept ‘magnets’ (i.e., the entia which are magnets) possess the property referred to by the concept ‘attracting iron’, i.e., the property of attracting iron.

Consequently, a judgment shows one of the rules by means of which grasping the sense of the given ens-concept is possible in that semanticising area, but it also shows that characteristics and properties are at different levels. A complex discussion should be developed here, about the different ways in which a judgment may correlate ens-concepts and property-concepts. However, I do not want to get into such a question here.

In conclusion, *an ens is a knot of properties and an ens-concept is a knot*

of characteristics (the property-concepts which it may be predicated of). If we eliminate all properties, we will not have any ens left, and if we eliminate all the property-concepts, we will not have any ens-concept left, exactly in the same way (by using a “vegetable” metaphor) according to which we will not have any artichoke left, if we remove all its leaves, or we will be left with no onion, if we remove all its tunics (see scheme).

Let us note, though, that reducing an ens-concept to the property-concepts which are predicated of it, or an ens to the properties which it possesses, does not amount to idealistically evaporating the ens. It only amounts to claiming that at an epistemological level an ens-concept can only be grasped by grasping the property-concepts of the semanticising area which it belongs to. Similarly, an ens can only be known by means of the knowledge of its properties. And this has nothing to do with a theory which claims the vanishing of entia at a metaphysical level.



## References

Boniolo, G. (1999), *Metodo e rappresentazioni del mondo. Per un'altra filosofia della scienza*, B. Mondadori, Milano.

