STRUCTURE AND MEANING

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Two Approaches to Language

It seems that the theories of language of the present century can be classified into two basic groups. The approaches of the first group perceive language as a mathematical structure and understand any theory of language as a kind of application of mathematics or logic. Their ideological background is furnished by logical positivism and analytical philosophy (esp. by Russell, Carnap, Wittgenstein and their followers); and their practical output is Chomskian formal syntax and subsequent formal semantics. The approaches of the other group do not approve of formalization and consider a theory of language closer to psychology than to mathematics. The specific position within this group is occupied by the so-called structuralists (de Saussure, Hjelmslev, Derrida).

However, this kind of classification is rather superficial; there is another classification that is really significant, and this classification cuts across standard philosophical schools. What makes the really fundamental difference is the way one views the link of an expression to its meaning. From this vantage point we can distinguish between approaches we shall call *semiotic*[1] and those we are going to call *structural*.

The approaches we classify as semiotic rest on the assumption that the significance or meaning of an expression does not depend on whether the expression is a part of language or of some other system of signs. Thus, a semiotic approach is characterized by considering language a means of codification of a pre-existing, language-independent world. The scholars who subscribe to this approach see the world as a definite system of objects; and they see expressions as labels which we must stick on these objects if we want to talk about them. This is a naive picture (Quine justly calls it the *museum myth*); nevertheless a picture that underlies (explicitly or implicitly) many theories of language of the present century.

The basic principle of the structural approach to language, on the other hand, consists in the conviction that any significance, or any meaning of an expression comes to it from its being part of the system of language. In contrast to the semiotic notion, this notion of language is based on the reluctance to see language as a kind of nomenclature. The meaning of an expression is, according to it, not a language-independent object casually linked to the expression, rather it is the *value* of the expression, its position within the system of language or within the language game to be played.

However, let us stress that the distinction between the semiotic and the structural view of language is far from coinciding with the distinction between logical positivism and structuralism, or indeed between any two philosophical schools. De Saussure, the father of structuralism, and Wittgenstein, the great dissenter of logical positivism, are personalities representing the structural approach to language most consistently and consequentially (and it is quite surprising how close the opinions of these two otherwise so different scholars in this point are[2]). The majority of other scholars, including both the avowed followers of de Saussure and those of Wittgenstein, on the other hand, have not succeeded in maintaining this view quite so systematically and consequentially.

The aim of the present paper is not only to survey the claims of what we have characterized as the structural approach to language; we would also like to document that such an approach is, contrary to common opinion, that of the most outstanding representatives of analytical philosophy. The main purpose of the paper then is to show how meanings can be considered to materialize out of the oppositions of the system of language.

The Untenability of the Semiotic View

Let us begin with neutral, commonly acceptable facts. Language expressions are subject to two kinds of relations: the 'horizontal' relations, relating them to other expressions, and the 'vertical' relations, linking them to their meanings. The terms *horizontal* and *vertical* amount to the schematic picture (due, in effect, to de Saussure) of Figure 1.

The horizontal and vertical relations are clearly mutually interdependent, and the majority of philosophers would probably agree that they rise and fall, so to say, hand in hand. The main difference

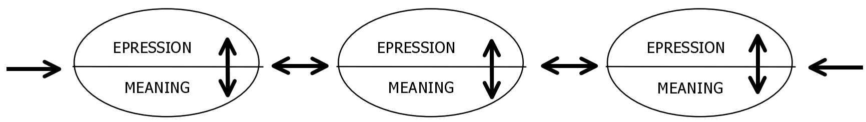

Figure 1: Horizontal and vertical relations

between the semiotic and structural approaches to language is the matter of which kind of these relations is granted primacy.

The semiotic view is based on the assumption that it is the vertical relations which are primary. (Let us stress that it is just this primacy that makes incompatible the semiotic with the structural view - that expressions are signs in the sense that they simply are significant - that they 'have meanings' - is a truism that would hardly cause a quarrel.) One of the clearest articulations of the semiotic approach was given by Charles Morris: 'The properties of being a sign, a designatum, an interpreter, or an interpretant are relational properties which things take on by participating in the functional process of semiosis. Semiotics, then, is not concerned with the study of a particular kind of object, but with ordinary objects in so far (and only in so far) as they participate in semiosis.' (Morris 1966: 4) If language has any structure, then it owes it to the fact that its expressions are signs (ibid: 17).

The structural view, on the other hand, grants primacy to the horizontal relations; it does not grant meanings any existence independent of the system of language. De Saussure pointed out that language cannot be considered as a nomenclature of real-world objects (de Saussure 1931: 65). Whatever it is that is signified, the signification relation arises from the interdependence of expressions within the system of language. It is thus the horizontal relations between expressions which are primary; and the vertical relations associating expressions with their meanings are derivative. De Saussure writes: '...the language has neither ideas, nor sounds, that existed before the linguistic system, but only conceptual and phonic differences that have issued from the system.' (de Saussure 1931: 65).

There is little doubt that it is the semiotic view that accords with common sense; moreover, it seems that this view is also (consciously or unconsciously) adopted by many scholars. However, it is hard to imagine that the view could be correct. De Saussure and some of the other structuralists criticised it explicitely; however, and this is often not noticed, very strong arguments against it are offered also by the results of the work of some of the most outstanding analytical philosophers. In fact, since the inception of analytical philosophy by Frege the semiotic view of language has had to suffer one blow after another. Frege (1892) recognized that if we identify the meaning of an expression with the real-world object which it is felt the expression normally stands for (the meaning of the expression *Morning star* with the planet Venus, for example), then we shall not be always able to recover the meaning of a complex expression from the meanings of its parts. Frege and Wittgenstein also realized that the elements of language that are primarily significant are not words, but rather sentences,[3] and that the discernment of the meanings of parts of a sentence is 'parasitic upon its structure'[4]. Quine (1960) documented that if there were a relation of reference connecting expressions with objects of the world, then there would not be a possibility of determining it; and Davidson (1977) used this result to show that in such a case the whole concept of reference lacks sense. All these results suggest that it is not possible to hold the semiotic view consistently.

Meaning vs. Synonymy

Semantics is by definition the matter of the vertical relations linking expressions to their extralinguistic meanings. However, there are also horizontal relations, relations between expressions, which are semantic in nature. These relations amount to similarity and dissimilarity of meaning, their most clear-cut representative being the relation of synonymy. Within the semiotic approach such relations are considered to be mere auxiliaries: saying that two expressions are synonymous is considered to be a mere shortcut for saying that they are linked to the same object.

Not so within the structural view. It is sameness-of-meaning and difference-in-meaning that are primary according to this view; meanings are mere reifications of these relations. In the same way as we posit colours by saying that two objects perceived as in a certain sense similar 'share a colour', we posit meanings by saying that two expressions understood as in a certain sense similar 'share a meaning'. Thus, the existence of meaning is considered as grounded in certain equivalences of expressions.

However, what is synonymy, if it is not the linkage to the same object? The answer, crucial for the structural approach, is that it is the sameness of position within the system of language, or the sameness of 'usability' within the language game to be played. It is the language itself and the way we use it that is primary; meanings (as well as other linguistic abstracta) are only our means of representing these primary facts, of 'making sense' of them. Wittgenstein (1953: §654): 'Unser Fehler ist dort nach einer Erklärung zu suchen, wo wir die Tatsachen als "Urphänomene" sehen sollten. D.h. wo wir sagen sollten: *dieses Sprachspiel wird gespielt*.' And further (ibid: §656): 'Sieh auf das Sprachspiel als das Primäre! Und auf die Gefühle, etc. als auf eine Betrachtungsweise, eine Deutung, des Sprachspiels!'

When we use language for the purpose of communication, we come to perceive any expression as a tool more or less suitable for our purposes; we come to see it as possessing a certain *value*. (The task of an expression may - in a particular case - be seen as representing an object, as being a *name*; in such a case its value may possibly be identified with the object. But this would be quite a special case.) Expressions which are usable to the same effect have equal values, they are *equivalent*; and synonymy is primarily just this kind of equivalence.

It is illuminating to consider the similarities between language and a game such as chess (and it is characteristic that both de Saussure and Wittgenstein, not to speak of Frege, Husserl, Jakobson and others, made use of this comparison quite frequently). What turns a piece of wood into a chess knight, what makes it meaningful within the chess game, is not primarily some link to a material entity ('knighthood'), but rather the rules according to which it is treated. If there is a 'knighthood', then it owes its being to the rules of the chess game. Similarly, what makes an expression meaningful within the system of language is not its link to a pre-existing meaning, but rather the rules of language; and meanings owe their existence to these rules.

The semiotic view is based on the assumption that what is primary are the vertical relations, and that the horizontal relations of synonymy or of likeness and difference in meaning are mere auxiliaries which help us speak about those that are vertical. However, the structural approach recognizes that this is not an assumption adequate to the real functioning of language: what is ultimately primary ('*Urphänomene*') are the similarities and differences between the usability of expressions, and the concept of meaning is our hypostatic means which facilitates speaking about these similarities and differences and making efficient theories from them.

The Indeterminacy of Meaning

One of the basic characteristics of the structural approach, as contrasted with the semiotic one, is the fact that it leads to the notion of meaning that is in a sense indeterminate or relativistic. If it is the process of semiosis that establishes the link between an expression and its meaning, then there is no room for any kind of indeterminacy: there must be a determinate, pre-existing object that becomes meaning through semiosis. If it is, on the other hand, the position of the expression within the system of language hat establishes its semantics, then any entity the expression may be seen to stand for can be determined only differentially, as opposed to the entities other expressions stand for.

Let us imagine that speaker S_1 uses the name 'N' for an object A, while his fellow speaker S_2 misuses the same name for another object B. How can they find out that they use the name in different ways? If A and B can be unequivocally pointed at, then there is, of course, no problem; but this is usually not the case. However, even if there is no direct pointing at, the resolution seems to be quite simple. S_1 can say: 'You call B "N", but "N" is in fact the name of A!' This possibility is nevertheless limited to the case when both speakers are in possession not only of the name 'N', but also of the names 'A' and 'B'. What about the case when they have no alternative names?

In such a case S_1 cannot, of course, say 'What you call "N" is not N!'; because for S_2 what he calls 'N' surely *is* N. However, if there is something that is true for A, but not for B, then S_1 can make use of this fact. If, e.g., A is green, whereas B is blue, then S_1 can put forward the statement 'N is green'; S_2 will disagree, and S_1 and S_2 then have to conclude that they use 'N' in different ways (presupposing that neither of them is colour-blind).

Thus S_2's misuse of 'N' may be discovered as soon as the speakers encounter a sentence containing 'N' and such that it would be true in case 'N' were A and false in case 'N' were B. If there is no such sentence (and if A and B cannot be distinguished by direct ostension), S_1 can never find out that S_2 is talking about another object. This is the case of Quine's (1960) illustrious example of a rabbit and its undetached part. Another prominent example is that of the meaning of numerals: all of Peano arithmetic does not allow us to distinguish whether a number is the set of equipotent sets (as Frege, in effect, maintained), or the set of all the numbers smaller than itself (as von Neumann proposed), or a primitive object.

This means that if A differs from B in a property *expressible in the language in question*, the confusion of their names can be discovered. On the other hand, if no such difference exists, then there is no possibility of recognizing the confusion, and it is thus altogether problematic to speak about a confusion. To say that 'N' is used to name two different objects makes sense only with the background of a language which has two different names for the two objects. If we can distinguish the two objects by means of what can be said about them, then the different names can possibly be formed as definite descriptions, otherwise not. This is Quine's *inscrutability of reference*.

This precisely is the contrast between the the structural and the semiotic views. If we accepted the semiotic view, then we could not see any problem in determining whether 'N' refers to A or B even if A and B had precisely the same properties; 'N' would simply unequivocally refer to that object which took part in the relevant process of semiosis. Not so within the structural approach: we may differentiate horizontal links only in terms of vertical ones, and where there is no difference on the horizontal level, there cannot be a difference on the vertical one. Any difference between meanings of two expressions must be based on a difference between the functioning of the expressions within language.

However, it would be essentially wrong to interpret this structural indeterminacy as implying that we cannot know what the meanings of our expressions are. The right interpretation is rather that meanings are not definite in the sense presupposed by the semiotic view. There is little doubt that natural numbers do exist; at least to the extent to which objects which cannot be touched and tasted can exist. And we consider them unique existing objects although we know that for all we care they can be identified with objects of various kinds. A number is not one of the things it can be reduced to, it is rather what all of these things have in common, it is *a number*[5]. And what can be said about numbers, can, more generally, be said about meanings: the meaning of an expression is not one or another definite thing conforming to our usage of the expressions within language; at most it may be said to be what all such things have in common. As de Saussure puts it: 'Language is a form and not a substance' (de Saussure 1931: 122). What is basically relevant for meaning is the *structure* of language.

Structure and Parts & Wholes

Structure is the way in which a whole is composed out of its parts; therefore there is no structure (and also no structuralism) where there are no parts and wholes. This indicates that the notion of structure is meaningful only within the context of a part-whole system. Let us, therefore, survey several important facts concerning part-whole relations and part-whole systems. To make the summarization rigorous, we shall need some mathematics, but to make it comprehensible, we shall not go into any mathematical details.

A part-whole system can be considered as a set U of items plus a set of certain 'operators' each of which maps an n-tuple of items of U (parts) on an item of U (whole). Hence a part-whole system can be considered as the ordered pair $\langle U,\langle O_i\rangle_{i\ I}\rangle$ where U is a set and each O_i is a (in general partial) function from the Cartesian power U^n into U; in other words a part-whole system is a certain (partial) algebra. If $e=O_i(e_1,...,e_n)$ for some $e,e_1,...,e_n$ U and for an i I, then we say that e is composed out of $e_1,...,e_n$ (in the way O_i).

What kind of algebra is a part-whole system? Can any partial algebra be meaningfully considered as a part-whole system? Certainly not - if the operators of an algebra are to be considered as operators of compositions, then they must fulfil certain restrictions. If $A=\langle U,\langle O_i\rangle_{i\ I}\rangle$ is an algebra, let us define the relation P_A in such a way that $e\ P_A\ e'$ iff there is an $i\ \ I$ such that $e'=O_i(...,e,...)$. In case A is a part-whole system, P_A is the relation of *an immediate (proper) part* - the relation of a general (proper) part can then be defined as its transitive closure. This means that A can be a part-whole system only if P_A fulfils certain conditions - if it is acyclic (its transitive closure is antisymmetric) and if it fulfils some other more intricate conditions, which we are not going to discuss here[6]. Hence we may say that a part-whole system is an algebra A, for which the relation P_A has the properties appropriate for the relation of an immediate (proper) part. One basically important thing concerning part-whole systems is that the part-whole structure offers the basis for induction: for a property to be instantiated by all the elements of a part-whole system, it is enough to be instantiated by all the simple elements (those which have no parts) and to be inherited from parts to wholes.

Several important concepts are now intrinsically connected with the notion of part-whole system, especially the concepts of *substitution*, *interchangeability* and *compositionality*. Let us outline general definitions of these notions[7].

(1) A *substitution of an item e_a for an item e_b within an item e*, denoted by $e[e_a/e_b]$, is the item that is composed in the same way as e with the single exception that e_b is used everywhere instead of e_a. The precise inductive definition could run as follows: (basis) if e is simple, then either e is e_a and then $e[e_a/e_b]=e_b$, or e is not e_a and then $e[e_a/e_b]=e$; and (induction step) if $e=O_i(e_1,...,e_n)$, then either e is e_a and then $e[e_a/e_b]=e_b$, or e is not e_a and then $e[e_a/e_b]= O_i(e_1[e_a/e_b],...,e_n[e_a/e_b])$. The restrictions imposed on algebra to be a part-whole system should guarantee that this definition is correct: that $O_i(e_1[e_a/e_b],...,e_n[e_a/e_b])$ is the same object as $O_j(e_1'[e_a/e_b],...,e_m'[e_a/e_b])$ whenever $O_i(e_1,...,e_n)$ is the same object as $O_j(e_1',...,e_m')$.

(2) If R is a binary relation on U, then e_a and e_b are said to be *interchangeable w.r.t. R* iff $e[e_a/e_b]\ R\ e$ for every item e. If R is a binary relation on U, then the minimal relation R' containing R and such that any two elements equivalent according to R' are interchangeable w.r.t. R' is called the *interchangeability closure* of R. The interchangeability closure of a binary relation is always existent and unique; an interchangeability closure of an equivalence is again an equivalence.

(3) A function F on a part-whole system is called *compositional* iff

there is a general rule how to recover the value of F for the whole from its values for the parts, i.e. if there is, for every $i \in I$, a function F_i such that $F(O_i(e_1,...,e_n)) = F_i(F(e_1),...,F(e_n))$. (This, as well as all the following equations, is to be understood in the extended sense, such as stating that the equated values are either equal or are both undefined.) It can be proven that the function F is compositional if and only if its kernel (i.e. the relation KER_F such that $e\, KER_F\, e'$ iff $F(e)=F(e')$) contains its own interchangeability closure; therefore the following definition seems to be plausible: a relation is called *compositional* iff it contains its own interchangeability closure. Thus, a function is compositional if and only if its kernel is. If R is a compositional relation and e_1 R e_2, then $e[e_1/e_2]$ R e for every e; hence if F is a compositional function and $F(e_1)=F(e_2)$ then $F(e[e_1/e_2])= F(e)$ for every e.

Compositional functions and relations occupy a somewhat outstanding position among other functions on a part-whole systems. (If we see part-whole systems simply as algebras, then compositional functions coincide with homomorphisms and compositional relations with congruences.) We shall see later that there may be good reasons for approving only compositional relations and functions; and in such a case we must consider any non-compositional relation or function a mere approximative or incomplete representation of a compositional one. This poses the problem of 'compositionalization', of finding a relation (function) that could be considered a reasonable approximation of a given relation (function).

This problem is easily solvable for relations, and not so easily for functions. Every relation can be extended to a compositional relation, the smallest of such relations always being its interchangeability closure. R is clearly compositional if and only if it contains (and consequently is identical with) its own interchangeability closure.

A compositionalization of a function is a more problematic matter. In contrast to the case of relation, it is surely not the case that every function could be extended to a compositional function. However, a function can be *refined* to a compositional function. This means that if F is a function from a part-whole system into a range S, then there exists a function F' with the range S' and a contraction c of S' to S such that c(F'(x)) = F(x). More precisely, if F is a function from a part-whole system P into a set S, then there is a part-whole system P', a compositional function F_1 from P to P' and a compositional function F_2 from P' into S such that F is the composition of F_1 and F_2. Thus, a noncompositional function can be decomposed into two compositional functions: but this may require an intermediary system of objects (P'). This indicates that *turning an noncompositional into a compositional function may necessitate new kinds* *of objects*.

An Example

Let us imagine we have the objects **a**, **b**, **c**, **d**, **e**, **f** such that **c** is composed out of **a** and **b** and **d** is in the same way composed out of **b** and **a**; and that **f** is composed out of **c** and **e**, and **g** is in the same way composed out of **d** and **e**. We can imagine the objects as the geometrical shapes of Figure 2. Hence we have the part-whole system <U,<O_1,O_2>>, where U={**a**,**b**,**c**,**d**,**e**,**f**,**g**} and O_1 and O_2 are partial binary function on U such that O_1={<<**a**,**b**>,**c**>,<<**b**,**a**>,**d**>} and O_2={<<**c**,**e**>,**f**>,<<**d**,**e**>,**g**>}.

d is an immediate part of **g**, and **a** is an immediate part of **d**; hence **a** is a part of **g**, but it is not its immediate part. The substitution **f**[**c**/**d**] of **d** for **c** in **f** yields **g**; the substitution **f**[**d**/**c**] of **c** for **d** in **f** yields **f** (because **d** is not a part of **f**); the substitution **f**[**c**/**a**] of **a** for **c** in **f** yields nothing at all (because O_2(**a**,**e**) is undefined).

Let R be the equivalence on U that yields the two equivalence classes {**a**,**b**,**c**,**d**,**e**} and {**f**,**g**}. **a** and **b** are interchangeable w.r.t. R and so are **c** and **d**; but **a** and **c** are not interchangeable w.r.t. R, since, e.g., **f**[**c**/**a**] is undefined. This means that **a** and **c** are not interchangeable w.r.t. R, although **a** R **c**; hence R is not compositional. The interchangeability closure of R is the compositional equivalence R' that yields four equivalence classes: {**a**,**b**}, {**c**,**d**}, {**e**} and {**f**,**g**}.

Let us imagine we have the function F that assign the value α to **a**, **b**, **c**, **d** and **e** and the value ß to **f** and **g.** Then F is not compositional. To see

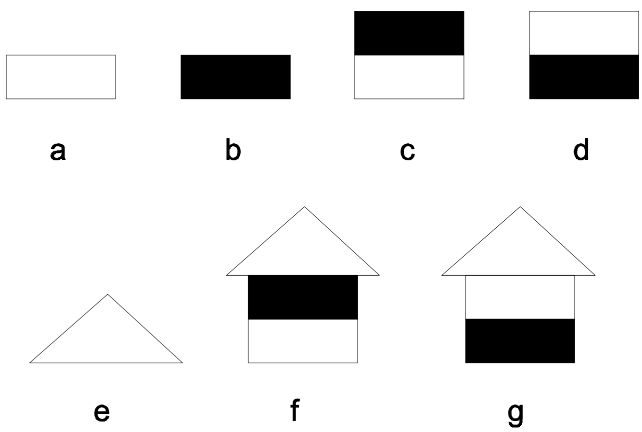

Figure 2: Example of a part-whole system

this, let us assume that there is a function O_2' such that $F(O_2(x,y))=O_2'(F(x),F(y))$ for every x and y of U; then $ß = F(\mathbf{f}) = F(O_2(\mathbf{c},\mathbf{e})) = O_2'(F(\mathbf{c}),F(\mathbf{e})) = O_2'(\alpha,\alpha) = O_2'(F(\mathbf{a}),F(\mathbf{b})) = F(O_2(\mathbf{a},\mathbf{b}))$, but $O_2(\mathbf{a},\mathbf{b})$ is undefined. (The noncompositionality of F follows directly also from the noncompositionality of KER_F - and this noncompositionality was proved above.) To make F compositional we have to refine it, to split α into three values: **a** and **b** will be assigned the first of them, **c** and **d** the second, and **e** the third. Hence we may have the compositional function F' that assigns α_1 to **a** and **b**, α_2 to **c** and **d**, α_3 to **e** and ß to **f** and **g**.

In terms of F we can distinguish two kinds of objects: if we say *x is a(n) y* instead of *F(x)=y* and if we say *non-house* instead of α and *house* instead of ß, then F allows us to articulate statements to the effect that an object of U either is or is not a house. But to make this distinction compositional we need a finer classification of non-houses: we must distinguish among an oblong, a square and a triangle. The abstract objects ('categories') *oblong* (α_1), *square* (α_2) and *triangle* (α_3), which have been employed to 'refine' the object *non-house* (α), can thus be looked upon as brought into being by the compositionalization of the opposition between houses and non-houses.

Language as a Part-whole System

It is clear that language can be seen as a part-whole system; and that it is just this view that underlies the very idea of grammar. To compile a grammar means to explicitly reconstruct the factual phenomenon of language as a part-whole system. A meaning-assignment is then a compositional mapping of the part-whole system of language on a system of denotations. What the structural approach to language claims is that meanings are kind of outgrowths of the oppositions present within the system of language. In algebraic words, that the meaning-assignment is somehow induced by some kind of binary relations on the part-whole system of language.

We may say that meanings owe their existence to synonymy, that they are 'reifications' of synonymy; in the sense of Quine's (1992) 'there is no existence without equivalence'. But what we are going to argue for here is a much less trivial thesis: that meanings are 'reifications' of relations much more elementary than that of synonymy, in the paradigmatic case of the opposition between truth and falsity. Sameness of truth values is an equivalence; and it directly reifies into the two truth values. However, if we try to distinguish between truth and falsity *compositionally*, we may need many more values, and what we argue for is that meanings can be plausibly considered as just these values.

To say that sameness of truth values is a compositional relation is to say that language is extensional. The point is that compositionality of the sameness of truth values implies that for every sentences S,S_1,S_2 the sameness of truth values of $S[S_1/S_2]$ and S follows from that of S_1 and S_2; and this is just what can be considered as the general definition of extensionality. However, the profusion of modal and intensional contexts of our language documents that language is in general far from being extensional: to take the most traditional example, *Necessary* S_1 may well differ in truth value from *Necessary* S_2 (i.e. from *Necessary* S_1 $[S_1/S_2]$) even in the case when S_1 and S_2 do not differ. Hence the relation of sameness of truth value of sentences of our language is in general surely not compositional.

We have seen what we have to do when we want to make a function compositional: we have to refine its range. This means that if we want to distinguish between truth and falsity compositionally, we do not make do with the two truth values themselves. In order to be able to classify sentences into true and false in a compositional way, we need a much more fine-grained ('auxiliary') classification. If the truth value of *Necessary* S_1 differs from that of *Necessary* S_2, then S_1 and S_2 must have different values even if these have the same *truth* value. From the viewpoint of truth, S_1 and S_2 do not differ when taken as wholes *per se*, but they differ when taken as parts, as building-blocks.

This means that as soon as we take compositionality as a principle, then *the value issuing from the differentiation between truth and falsity* is a value quite different form *the truth value*. The sameness of the former implies the sameness of the latter value; but not vice versa. Hence as soon as we take compositionality as a principle (and if we realize the nonextensionality of our language) we cannot account for truth without an elaborate system of values, without meanings.

Infinity and Compositionality

We have shown that if we want to treat truth compositionally, we need meanings. What we have not shown so far is why compositionality is crucial. To show this, we must consider the very role of abstract entities for our comprehending our world.

There are 'real' objects we perceive, and there are abstract objects we posit. We may posit objects explicitly with the knowledge that they will help us formulate efficient theories of our world, or we may posit them as tools implicit to our very act of comprehending the world[8]. The simplest situation of positing an abstract object is that of grasping a similarity between 'real' objects as *something they have in common*. However, there are also less trivial ways of positing objects. One of those situations is connected with the way we treat infinity; and it is just this situation that is crucial for our understanding of the nature of meaning.

Our view of our world is so infiltrated by contemporary mathematics based on Cantor's set theory that we count infinite sets among the uttermost realities. However, on second thought it is quite clear that there is no infinite set we could really encounter within our 'real' world. Everyone of us can be confronted (at once, but also during the whole span of his life) with at most a finite number of objects. The only aspect of reality that may be felt as amounting to infinity is *unlimitedness*, the possibility to continue various processes over and over without any limit.

In other words, there is no *actual* infinity, there is at most *potential* infinity. There is no 'real' infinite set of objects, but there are 'real' devices which make it possible to 'generate' objects without any limitation ('*ad infinitum*'). We can never encounter the set of all natural numbers; we can at most encounter a *rule* of the kind of '**0** is a number *x* is a number, then also *x*' is a number'. The rule in itself is in no way infinite (it is simply a fourteen-word phrase), it is only in a sense felt to *insinuate* infinity. This nature of infinity has been repeatedly pointed out - probably for the first time by Aristotle, and more recently by several of the most outstanding mathematicians and philosophers of this century[9] - but many theoreticians simply ignore it.

However, if there are no real infinite sets beyond those grounded in a finite number of generating rules, then there are also no functions with infinite domains beyond functions defined via finite rules. There is no way of defining a function on an infinite domain, save by giving its values for a finite number of basic elements and then giving a finite number of rules to compute values for new elements from those already computed. We may define function f with its domain equal to the set of all natural numbers by defining f(**0**) and giving the recipe how to compute f(*x*') out of f(*x*), or we may base the definition on a more complicated system of rules generating natural numbers, but it is impossible to define such a function directly, bypassing generating rules altogether.

If we understand generating rules as rules of composition of wholes out of parts (which can be in some cases taken literally and in others as an illuminating metaphor), then we can say that there is no 'real' infinite set without a part-whole structure; and that there is no 'real' function on such a set that would not follow the part-whole structure, i.e. which would not be compositional. Thus, *reality is restricted to part-whole systems and to functions compositional on part-whole systems.*[10]

Due to the Cantorian indoctrination we comprehend the world in terms of functions that are not necessarily compositional. This leads to the conviction that any opposition expressed in terms of a classificatory function is a function with merely two values. The opposition between truth and falsity means simply a function that assigns *truth* to the true statements, and *falsity* to the false ones. However, we have seen that such an opposition may call for a much wider range if it is to be accomplished compositionally. We have seen, in our oversimplified example, that to distinguish between houses and non-houses compositionally, we cannot make do with two values, that we need a finer system of values. Similarly to distinguish between truth and falsity compositionally we need a much finer system of values than the pair of the two truth values themselves: we need meanings.

We might be tempted to say that meanings result from compositionalization of truth. However this statement may be misleading: it seems to suggest that there is a direct, noncompositional characterization of truth which we would compositionalize positing meanings. But there is in fact no such direct characterization. Maybe there is a God who is able to grasp infinity directly and who thus perceives our positing meanings in this way; but for us the compositional way is *the only* way. Any more direct differentiation is our mythical creature that is licensed by set theory which embraces actual infinity and which can only be talked about, but never really demonstrated. We may well talk about the infinite class of all the expressions of our language, but such talk makes real sense only because we can understand it as a 'shortcut talk' about our *ability* to form new expressions 'forever', or about the *grammar* of our language. And we can also well talk about direct, noncompositional assignment of truth values to sentences, but we can make real sense of this talk only in so far as we can understand it as a 'shortcut talk' about (compositional) meaning-assignment. There is no possibility of characterizing true statements without specifying the meaning of some basic expressions and specifying how meanings of wholes depend on meanings of their parts.

Two Approaches to Language Revisited

The concept of meaning is trivially interrelated with that of synonymy: if we have meaning we *eo ipso* have synonymy ('sameness of meaning'), and if we have synonymy we *eo ipso* have meaning ('value shared by synonymous expressions'). The semiotic approach tries to offer an independent explication of the concept of meaning: meaning of an expression is a real-world object casually connected with the expression; two expressions are hence synonymous if they are so linked to the same objects. The structural view proceeds the other way round: it tries to reduce the concept of meaning to the concept of synonymy.

Synonymy is, according to this approach, sameness of role within the system of language or within a relevant language game, and this in turn is the role of the building-block within the account for certain oppositions, especially for the opposition between truth and falsity. Thus, the meaning of an expression is a value, it is the value that determines the kind of brick the expression is, how it can be utilized within the opposition-based building of language.

We have concentrated on meaning; but also other linguistic abstracta can be accounted for in similar terms. Grammatical categories, for example, can be conceived analogously, as a means of differentiating well-formed expressions from mere nonsensical sequences of words. Evidently the differentiation alone would amount to no more than two categories (*expressions* and *non-expressions*); if it is, however, accomplished compositionally (i.e. if the category of a complex expression is uniquely determined by the categories of its parts), then what is brought into being are grammatical categories in the usual sense. Thus, compositional differentiation is responsible not only for meanings, but for the whole of what de Saussure calls *linguistic reality*.

That meanings and other linguistic abstracta issue from oppositions does not contradict the fact that the oppositions do not manifest themselves in language as perfectly sharp and clear-cut, that the boundary between, e.g., truth and falsity is notoriously fuzzy. The concept of synonymy, and hence also that of meaning, is based on a intentional simplification: we consider two expressions synonymous if their likeness exceeds such or another boundary. This may lead us to split meaning into various levels corresponding to some natural boundaries[11], and eventually it may lead us to deny the reasonableness of the treatment of meanings as objects altogether[12]. However, such a simplification necessarily occurs with every abstraction: to speak about expressions being synonymous does not seem to be more far-fetched than to speak about, say, objects having the same colour.

Conclusion

There is meaning only in so far as there are synonymous expressions. And expressions are synonymous only if they contribute in the same way to truth, i.e. only if they are intersubstitutive *salva veritate* (or, more generally, if they are intersubstitutive with respect to the usability of language statements in various language games). Hence there is meaning only in so far as there is truth.

On the other hand, there is no truth without meaning. In some simple artificial languages there can be truth without meaning; in a universal natural language comprising an infinite number of truths this is, however, not possible. Truth as a property of statements is a *compositional* property (for there is, strictly speaking, no 'real' noncompositional property), and as a compositional property it rests on meaning. Meaning is the *value* of an expression with respect to the opposition between truth and falsity; meaning is the product (or, if one prefers, a by-product) of the compositionality of truth[13]. Meaning is in this sense implicit to truth; and we can make it explicit ('explicate it') in that we make a theoretical reconstruction of language as a part-whole system and if we evaluate its expression to make a compositional (recursive) characterization of truth[14].

Philosophers of diverse provenance claim that the hierarchical structure of abstract entities which are the means of our comprehending our world arise from some kind of associations[15]. What has been said here implies that associations, or at least some of them, need not be accounted for as primary phenomena, rather that they may be considered necessary implicit means of our making sense of oppositions, of our *understanding* oppositions, since understanding is finitistic and hence compositional. We associate synonymous expressions, but we do so because we want to distinguish between true and false sentences and since synonymy represents the only way to accomplish this compositionally.

Notes

1. A less ambiguous way to call this approach would be to use the term *nomenclatural*, employed by Peregrin (forthcoming b), but here we want to stress the roots of this approach, which are connected with understanding language as arising out of a process of *semiosis*.
2. Cf. Harris (1988). See also Peregrin (forthcoming a).
3. "Nur im Zusammenhang eines Satzes bedeuten die Wörter etwas." (Frege 1884: 73). "Nur der Satz hat Sinn; nur im Zusammenhange des Satzes hat ein Name Bedeutung" (Wittgenstein 1922: §3.3. Following the usual praxis we quote Qittgenstein by paragraph numbers rather than page numbers.)
4. In Dummett's (1988) term.
5. As Quine puts it: "there is no saying absolutely what the numbers are; there is only arithmetic" (Quine 1969: 45).
6. See, e.g., Simmons (1987).

7. It is not usual to address these notions on such a general level; the only algebraic theory that does go into this and that is known to the author is that of Aczel and Lunnon (1991).
8. For detailed analysis of the situation we refer the reader to the writings of W.V.O.Quine, esp. Quine (1992).
9. E.g. Hilbert (1925), Wittgenstein (1964), Lorenzen (1957) or Vopenka (1979). Vopenka also provides an insightful analysis of how we are "held captive" by the Cantorian framework. Cf. also Hailperin (1992).
10. Thus, if we insist on direct reconstruction of reality in terms of infinite sets, then infinite sets in the sense of Brouwer (1920) are much more appropriate than those in the traditional sense.
11. The Fregean split of meaning into *Sinn* and *Bedeutung* is well known, but we can go even further. Cf. Peregrin (1992).
12. And this is indeed the conclusion reached by such scholars as Austin, Wittgenstein and Quine.
13. This way of viewing meaning is indeed quite close to that put forward by some analytical philosophers, especially Davidson. Thus. Davidson writes: 'I suggest that a theory of truth for a language does, in a minimal but important respect, do what we want, that is, give the meanings of all independently meaningful expressions on the basis of an analysis of their structure' (Davidson 1984: 55). See also Peregrin (1994).
14. See Peregrin (1992; forthcoming b).
15. Statements to this effect can be found in the writings of Aristotle and Kant as well as in those of the modern philosophers from Husserl (1900/1) and Carnap (1928) on. The paradigmatic picture is the Aristotelian one, as characterized by Cassirer: 'Nothing is presupposed save the existence of things in their inexhaustible multiplicity, and the power of the mind to select from this wealth of particular existences those features that are common to several of them.' (Cassirer 1910: 4)

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