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HOW TO DEAL WITH WHAT IS HEARD OR READ

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People very often ask other people to repeat what was said. According to the custom, the repetition needs to be both sufficiently precise but not too precise. Let's start with the latter condition — that the repetition is not too precise. The intention is that our interlocutor speaks with their normal voice and does not imitate the voice of the speaker, does not imitate lisping or stuttering. Sometimes the repetition is more correct than the original, e.g. when occasional slips are corrected. We aim at what was said and not — how it was said. If the speaker used Italian, we do not need to repeat in Italian. A good translation is a good repetition. We can assume that the repetition is a transitive relation, thus if B is a repetition of A, and C is a repetition of B, then C is a repetition of A. It is a controversial matter whether the repetition is a symmetric relation, that is, if the original can be regarded as a repetition of a repetition. The doubt comes from the fact that the repetition is perhaps systematically different from the original, for example it uses a simpler syntax or intonation, in the way, for instance, the answer is different from the question when it comes to intonation. It is easier to repeat individual words or sentences than other sequences of words. Thus, we will mainly consider repetitions of sentences or sequences of sentences. What is important is that the repetition is synonymous to the original. Synonymy is a relation between some sentences. Let's bear in mind that a sentence may be composed of a few sentences, not necessarily linked by *and* or *when*; it may contain complicated structures, e.g. adverbs. Thus, the sentence: *Traveling by train, Felicia read a book*, is synonymous to: *When*

Felicia was traveling by train, she read a book. If, or as long as, a property systematically differentiating repetitions from originals has not been found, it can be assumed that the repetition of a sentence is a symmetric relation.

The repetition or reciting of poems is especially problematic. This is because rhythm and rhyme play a role in poems. The *Father's Return* (*Powrót taty*) by Adam Mickiewicz reads: *modlą się dziatki do Boga, // wziął mnie najpierw śmiech pusty, // a potem litość i trwoga* [I heard at prayer children dear // first I burst into laugh derisive // but then came pity and fear]. Mickiewicz used the rhyme present in the saying: *Jak trwoga to do Boga* [When in fear, God is dear], however, in a reverse order. Also, in the poem there is the sentence: *i u mojej żony jest synek taki maleńki* [and at my wife's there is a son so small], which is of Russian influence. It could indicate that the villain speaks a forest, villainous, Eastern dialect, however, as the rest of the poem does not confirm this hypothesis, it seems to be the authors mistake. So far we have discussed sentences, but we also want to discuss sequences of a few, several, or even longer sentences. In practice we are not able to keep up with repeating such long utterances. We need help in the form of tape recordings or notes. However, reading notes aloud is a doubtful repetition of an original utterance.

We are at the boundary of research on written texts. Of course, the above remarks on Mickiewicz's text also belong here. Yet the distinction between oral and written texts is artificial and confusing. Whatever is in Polish, it is in speech. Writing only codes speech, and it does so poorly. The reasons for this are many. For example, *rzeka* [river] and *żebro* [rib] have the same initial sound in pronunciation which are spelled differently. It is historically motivated, since Russian has *reka* [river], and Slavists surely discovered that the two words are somehow related a long time ago. Still this reason is not sufficient to make it difficult for millions of children to learn its spelling. However, also internal factors in Polish dictate complex spellings. We have *dół* [pit] spelled with *ó*, because the possessive case is *dołu*. In general, if a word has the sound *u*, and one of its grammatical forms has the sound *o* in this position, then instead of *u* the spelling is *ó*. A certain young man in my family wrote *kóra* instead of *kura* [hen]. After having been reprimanded he explained: yet there is *kogut* [rooster].

As long as the orthography does not correspond with the pronunciation, mastering spelling is made difficult for millions of children. However, easier accessibility to audio tapes opens up possibilities to replace writing with tapes. It may happen that writing will be rare. Newspapers will be sold on tapes, there will be tape libraries next to libraries, children will be excused

from learning orthography. What a relief! The ability to read will decrease and only archaeologists will be able to read our books, however education will flourish. In certain species some individuals react to the voices of other individuals. The collective sound made by Canada Geese just before the whole flock flies away. It seems that this squawk helps them to form a beautiful V-formation.

We do not know if other species can repeat because we do not know what sound differences cause what semantic differences. For example, we know that Polish *liść* [leave] and *kiść* [bunch] are different, but it is because we use semantic, phonetic and environmental knowledge. It is not possible to refer to such details in other species.

Teachers are able to hear and read their students' speech and writing, can influence how they students speak and write. Twardowski and his followers greatly contributed to the getting rid of the romantic style from colloquial Polish of the intelligentsia. They achieved this by requiring students to write summaries which were to be correct and to the point. But for me it is not enough. I need to engage students in a discussion. Summaries and remarks being something separate. This approach has two advantages. Firstly, it makes the summary objective. Secondly, it forces students to take a stance, to show themselves, to take part in a discussion. It helps students in any field to develop. And philosophy flourishes, when philosophers oppose. This is what Twardowski lacked. [Fortunately, it was in pre-war Warsaw.

While reading books we encounter confusing words like *time*. We understand the sentence in which the word occurs and we understand the role it plays in the sentence. It takes a long *time* to get to Gdynia from Kraków, and even more to Kraków from Gdynia as one needs to climb the mountains. The word has a different sense and role in the sentence: *I don't have time* (I am busy), than in: *In my times it used to be better*. Then what is *time*? It is difficult to find the answer to this question even in handbooks for physics or astronomy. If a piano player is asked about what a symphony is, then the answer is that it is a piece of music. If a further question is what music is, then the piano player will be silent for a few minutes but perhaps will murmur that it is an art of sounds, but if the question is what is art, then there is no answer. Similarly, nobody who is engaged in any art will answer this question. If the question is what is French, then the answer is that it is a language/tongue. But the question what is language/tongue will remain unanswered. A conclusion — if somebody asks you what is tongue, show them your tongue. I call such words ultimate terms. Other examples of ultimate terms are: *theory*, *animal*, *bird*, *plant*, *act*, *wisdom*,

number, *thought*, deed, *gravitation*. None of these words has a definition. Tuwim's famous sentence in *Kwiaty polskie* [Polish Flowers]: *Niech prawo zawsze prawo znaczy, a sprawiedliwość — sprawiedliwość* [May law always mean law, and justice — justice], compellingly shows that the two terms are ultimate. But perhaps it is not completely so, because law in a given period is clearly written and disregarding it is a crime, while there is no definition for justice. Everybody feels what is fair and just and what is not. We can differ in assessment, perhaps sometimes change our views, but in all these whims, justice is similar to beauty. These are ultimate terms, there is no definition for them and no retreat, though they are unpredictable, vague, capricious].[1]

[1](The first version as of March 2005. The fragment in square brackets [] is present in the March version, but not in editions from April and May 2005. (These are dates of the letters I received, and not of particular versions. It follows from the correspondence that the author chose the version without the fragment in square brackets — *note by Jerzy Pelc*).

Leon Koj

ON THE ORIGINS OF SET THEORY

Originally published as "O początkach teorii zbiorów," Studia Semiotyczne 26 (2007), 59–80. Translated by Julita Mastelarz.

1. THE SIGNIFICANCE OF EARLY CONCETPUALISATIONS OF A SET

A. Today there can be no doubt as to the fact that the concept of a set is indeed very significant. The complex mathematics we now have at our disposal allows us to make very precise descriptions of thousands of regularities and an even larger number of specific facts. Such descriptions enable us to infer about numerous phenomena that have not yet been directly encountered — they allow us to make predictions. The descriptive richness of the language of mathematics and the wealth of the methods of determining logical consequences can, in essence, be brought down to descriptive capacity and the deductive theory of multiplicities – i.e. general set theory. Since set theory is built around the concept of a set, this notion must be significant, as it is the source of the mentioned richness of its description.

B. The theory of multiplicities in its modern form was created roughly 120 years ago owing to the efforts of Frege, Dedekind, Peano, Cantor, Zermelo, Russel and Whitehead. The greatness of their achievements makes the works of Aristotle, Leibniz, Boole, Hamilton, Grassmann and others seem like the prehistory of set theory. This does not mean that before Cantor and Russel the concept of a set was useless or insignificant — it was used as often as it is today. However, in those times the notion was characterised so differently that it is more accurate to speak of multiple 'concepts' of a set, early and more primitive. Aristotle's syllogistics and direct lines of argument, for example, do not include 'universal names', 'empty names' and 'proper names'. This might indicate that Aristotle did not think that scientific discourse might include considerations on the relevant sets. It is

very probable that by 'sets' Aristotle simply meant 'types' or 'species'. His concept of a set was therefore slightly different from the one we use today. In Aristotle's terms, what we call a 'universal set' was 'being', something that transcended species and types.

Scholars who lived after Aristotle realised that there are numerous kinds of sets that are neither types nor species. These mostly included mathematical sets, such as series, sequences, finite and infinite creations. They discovered that it would be difficult to manage without the concept of an 'empty set' and — as a result — the corresponding notion of a 'universal set'. Each generalisation of the initial concept constituted a new concept of a set, even though not everyone was aware of this fact. In time the new conceptualisations of a set began to be defined; the modern axioms of set theory are a result of these very efforts. The axioms of set theory were not revealed overnight. Their discovery should rather be considered as an attempt to adjust our understanding of sets to their actual practice — mainly in mathematics. In the process of formulating notions of a set that would be in accordance with the practice, scholars arrived at ways of expression with new, unexpected and interesting consequences. In a word, the axioms of the theory of multiplicities show some features typical of explanatory hypotheses.

C. There are many very different systems of axioms in set theory. They are based on dissimilar philosophical backgrounds; they also vary in terms of complexity. They pertain to different definitions of a set. If we decided not to treat them as explanatory hypotheses clarifying and systematising some earlier assumptions (mostly mathematical theorems), we would have to determine which one system is true (they would not be regarded as purely formal constructs). This issue would then resemble a question considered in mid-19^{th} century and pertaining to the veracity of the various systems of geometry. Such a question has not been raised in relation to set theory. The different systems of axioms are usually regarded as a more or less general collection of hypotheses, which is simpler or more convenient for explaining the known rules of mathematics and seemed likely to give rise to many more interesting hypotheses. This attitude resulted from the conviction that the axioms of the theory of multiplicities do not pertain to different concepts of a set, but to a single common principle, a universal core of the concept of a set.

D. As we have already mentioned, in the course of centuries new sets were discovered and, as a result, the concept of a set had to be redefined or generalised (More on this subject may be found in Gruszecki 2005). However,

the basis for the definition of a set has never been refuted (the history of this issue shall not be recounted in the present article). Thus, the earlier definitions of a set did not convey the entire wealth of the characteristics of sets which were introduced later. These descriptions were partial definitions, mostly conditional in nature. This conclusion may be considered trivial, yet it allows us to infer that each early concept of a set is not a rival to the later ones, but a kind of a preliminary, incomplete condition. This situation has continued to the present day, although we are not able to tell which contemporary systems of axioms are earlier from a logical point of view and which ones are supplementary — such knowledge usually comes much later. In the course of the present analysis we shall assume that the characteristics of the earlier understanding of the concept of a set are conditional definitions and not systems of axioms.

E.1. We assume — without seeking proof in detailed historical analysis — that the first concepts of a set were based not on the rich mathematical experience, but on simple, easily accessible cognitive operations and ontological theorems which allow for such operations. Due to this conclusion, the first attempts of defining sets, primitive as they may be, must be considered significant, because they are based on very general ontic and cognitive principles.

E.2. The theory of abstraction was probably the first attempt not only to know more about sets, but also to define them. Its primary bases are the conviction that we are gaining knowledge about something that is of this world, and the simple assumption that cognition consists in comparing things. The comparison may produce a positive result: things are similar, or a negative result: things are not similar. This theory is based on the premise that similarities have sources. Many terms were used to refer to these sources: they were called 'attributes', 'essences' or 'species'. When considering similarity, we assume common features to be the source of the similarity. Today we are inclined to call this source of similarity 'a set', even though the difference between the traditional essence and an ordinary, non-specific set is huge. To avoid getting involved in philosophical disputes right at the beginning, we shall not speak of sets or attributes, essence or universals, but introduce a neutral term: 'generality'.

E.3. The successive sections of the present article shall provide brief and general descriptions of the mentioned principles. They have the form of epistemological principles corresponding to general ontic truths. It is the latter that we shall attempt to specify. The connection between epistemological principles and ontic principles was obvious to the ancient Greeks,

who perceived the world in a very realistic manner. They assumed that they were able to get to know the world in a given way, because this was the manner of perception enforced by the structure of reality itself. The mentioned ontic premises are as simple as epistemological principles. Each thing is similar to a number of things and dissimilar to a number of other things. The notion of similarity is crucial for these theories, therefore it must be considered in detail before we move to an analysis proper. First, however, let us turn to the question of whether analysing theorems as trivial as the one mentioned above is in any way worthwhile. For the time being, it appears that combining a key mathematical theory (the theory of multiplicities) with ontic and epistemological principles containing the concept of similarity, which are even more fundamental, is just as significant as the first concept of a set introduced with the use of the notion of similarity.

E.4. We might assume that the basic versions of the mentioned concepts of similarity pertained to objects which could be perceived by the senses. The notion was also used to introduce constructs that are less susceptible to sensory perception, namely essences, forms, attributes or sets.

It is also possible to presume that in the course of the analysis of sets, i.e. generalities, the separation from sensory empirical experience will be increasingly visible and emphasised. Let us follow this lead.

Despite its simplicity, the historical hypothesis presented above allows us to understand a certain fault of the considerations pertaining to the theory of multiplicities. As we know, contemporary systems of axioms are formally characterised and contain no elements that would suggest what constructs or what empirical systems ought to be attributed to the symbols of sets. The set axioms simply give no clues as to how sets can be distinguished in the empirical world.

Usually, however, we have very little doubt in this respect. Our ability to assign extralinguistic constructs to the right set category has been shaped by thousands of informal examples illustrating the essence of the concept of a set. Such examples have been presented since the times of classical Greek thinkers. They usually contain no distinct characteristics, but are related to the mentioned partial definitions. (For more on the subject of partial definitions see: the numerous works of M. Przełęcki.) Before we discuss them, it ought to be noted that this practice is the basis for interpreting axioms of the theory of multiplicities and, as such, has to be emphasised. This requires us to present an analysis of very early conceptualisations of the term ‘set’. Once again we arrive at the conclusion that the primitive conceptual frameworks are indeed very significant.

E.5. As noted above, usually we have no problems at establishing when and if we are dealing with a set. There are, however, cases that raise doubts. We shall now turn to two rather typical examples of such uncertainty. These testify to the need for clear specification of the conditions in which extra-theoretical constructs can be associated with symbols of a set. For the purpose of experimentation (without revealing my intent) I asked several respectable academics (not mathematicians) whether it is possible to create a set which would contain the following elements: a carrot bought today in the marketplace, Caesar, the first tree that William the Conqueror saw on the coast of England in 1066 and a living man from Ötz (a man from the bronze age found near the border between Italy and Austria). The answers I received were very different. The first one was: "it is not possible due to the fundamental reason — there is no such set." A different respondent considered making such a set possible, but condemned such an idea: a set like that would not be useful, and was even considered harmful in some way. Both these answers included the justification that the listed objects come from different places and different times, and have attributes that cannot be compared. These opinions testify to the fact that the respondents' understanding of the notion of a set differed from the one described by contemporary mathematicians, who — after a period of dispute — decided that it is possible to take one element out of any given set and make a new set comprising these elements. In other words, mathematicians adapted the axiom of choice. The list of items included in my experiment was a partial realisation of the axiom of choice. The opinions of my — highly educated — respondents may be treated as a clear proof of their ignorance. There is, however, a different interpretation. As late as the 1930s mathematicians were distrustful of the axiom of choice and singled out theorems whose proofs were based on the axiom. We may therefore assume that some people decided that a non-mathematical discourse ought to include a concept of a set which would not be characterised by the axiom of choice. On the other hand, there is nothing to substantiate the claim that non-mathematical considerations need to employ a concept of a set which includes the axiom of choice. This remains an open question and merits further analysis. It seems that tracing the evolution of the concept of a 'set' might be useful in solving this problem.

E.6. Let us now consider a different problem. Picture a wheel which is turning fifty one times. We are able to count each time the wheel spins. It seems logical that we ought to be able to create a set of these countable situations. And indeed we do, if only we reify the 'turning' and say: *the set contains 51 turns*. It is not possible to say: *we have a set of 51 'is turning'*.

Such a statement would be grammatically incorrect. It seems that, according to the rules of grammar, sets may only contain objects (of any type). This grammar suggests that the formula $p \epsilon X$ is not correct if p is a sentence-type variable and X is a name-type variable. Nonetheless, while counting the 'is turnings' we were ready to assume that these events may be made into a set. Was our initial intuitive guess wrong or is grammar (understood as a certain linguistic custom) not entirely suitable for describing reality?

Section E.2. suggests that the first sets, or generalities, were introduced into the discourse as sources or similarity. If event p does not belong to any set X, it is possible to assume that the relation of similarity that connects objects cannot occur in the case of events or, more generally, situations. Perhaps similarity cannot occur between situations, but only between the objects that are involved in the compared events? This would provide some explanation as to why situations and objects are treated differently with regard to creating sets. Solving the abovementioned problem requires analysing the concept of similarity and the early understanding of a set. The significance of analysing early conceptual frameworks is revealed yet again. An affirmative answer to the abovementioned question would allow us to incorporate situations and events into the general syntactic and conceptual structure of 'belonging to a set'.

E.7. The exact opposite of this problem arises if we base our analysis on the conceptual framework of situation, occurrences and the relations they enter, treating objects as derivatives. If we assume processes, not substances, to be the basis of reality, and consistently believe in 'procesualism' or 'eventism', we need to ascertain whether the conceptual framework of 'belonging to a set' can be incorporated into the conceptual framework of situation, events and the relations between them. If this could not be done, 'eventisms' and 'procesualisms' would prove to be useless hypotheses, unable to express the wealth of knowledge that has been gathered and described by the conceptual framework of 'belonging to a set'. Without a detailed investigation of the possibility of describing the notion of belonging to a set using eventistic or processual terms, these conceptual frameworks are not worth considering. This issue shall be discussed elsewhere.

II. ABSTRACTION AND SIMILARITY

A.l. Abstraction may be defined as identifying the common features of the compared objects and categorising them as separate entities simply called attributes, concepts, essences or types. Thus, the theory of abstraction is a theory of cognitive actions (the 'action' in this case is the mentioned process

of identification). This theory of our activities is based on certain ontological assumptions which are not always clearly specified, probably because they are considered entirely obvious. Identifying attributes is a cognitive action, as it occurs only in the case of comparing, i.e. in the process of getting to know things, recognising them or specifying. Let us now list a few ontological assumptions of the theory of abstraction which — due to their ontological nature – do not involve any actions. It is clear in making a comparison we assume the existence of at least two objects and, more generally, the existence of many different objects. These items must be somehow similar and also dissimilar in some other aspects. The most important premise of the theory of abstraction is the existence (which is non-separate, as it does not occur independently of the objects) of attributes being the basis for similarities and dissimilarities.

A.2. The following sections of the present article shall not discuss the theory of abstraction as such, but concentrate on its ontological bases. This change of subject is dictated by the observation that the modern set theory does not mention our cognitive actions, but only sets and the relations between them. The language of the theory of multiplicities is focused on objects, i.e. is fully ontological. Epistemological aspects appear only in philosophical comments pertaining to set theory and its theorems. If we are to retrace the origins of the theory of multiplicities and discuss generalities, we need to conduct our analysis at the ontological level — the level of the basis of the theory of abstraction. Any remarks formulated in a language which goes beyond that level will have the nature of informal introductions, comments, comparisons, etc. Ancient philosophers did not devote much attention to the concept of similarity. In our discussion, however, this notion constitutes the primary condition for identifying attributes — if similarity or dissimilarity did not exist, there would be no attributes to speak of. This fact makes it necessary to treat similarity as the primary issue of our discussion. We shall describe similarity on the basis of speculations related to the theory of abstraction and the nature of modern syllogistics.

A.3. The conclusions of the analysis shall be presented in the formalised language suitable for making inferences. We ought to start with specifying the denotation of the symbols that shall be used — the expressions of our language. The objects shall be represented by name-type variables, such as *x, y, z, x', y'*, etc. The name-type variables will not be divided into separate grammatical categories of individual or general variables. It is not our intention to arbitrarily divide beings into different types. Using this method to distinguish situations will be sufficient. Situations, states and

events shall be chosen from a set of sentence-type variables *p, q, r, s, t, p', q', r'*, etc. Name-type variables will be supplemented with the symbol of equivalence and a quantifier. Sentence-type variables shall be accompanied by known functors $\neg$, $\wedge$, $\vee$, $\Rightarrow$, $\leftrightarrow$ and Suszko's symbol of identity between sentences (the shape of this symbol is the same as the symbol of identity, which has already been introduced). The latter notation will not be used in this part of the analysis (the present article is a fragment of a larger structure). Another sign which shall be employed is the symbol of similarity $\sim$ (i.e. a sentence-making functor derived from two name-type arguments). The symbol for belonging to a generality will be regarded as defined in the successive theses treated as partial definitions. The mentioned symbols are associated with well-known syntax.

B.l. It has already been emphasised that, within the theory of abstraction, properties can always be attributed to several similar objects. Thus, attributes always have some general, communal aspect. If given objects are similar, then they belong to some (as yet unspecified) generality. This conclusion may be presented as follows:

$$(1) \quad \forall_{x,y}[x \neq y \wedge x \sim y \Rightarrow \exists_z (x \in z \wedge y \in z)]$$

Thesis (1) understood as a partial definition of belonging to a generality (for reasons specified above, I decided to use the expression 'belonging to a generality' rather than 'belonging to a set') does not fully specify this property. It has to be supplemented with other theorems.

B.2. Let us begin supplementing the thesis with specifying theorems that describe the properties of similarity. As we know, the identity of two objects is sometimes referred to as indiscernibility — the *identitas indiscernibilium* mentioned by Leibniz. According to this principle, if two objects differ in some aspect, they are not identical. Thus, two dissimilar objects cannot be identical. This conclusion is presented as:

$$(2) \quad \forall_{x,y}[\neg(x \sim y) \Rightarrow (x \neq y)].$$

After the transposition of elements of (2) we arrive at:

$$(3) \quad \forall_{x,y}(x = y) \Rightarrow (x \sim y).$$

After we discard quantifiers and substitute y/x, the antecedent becomes $x \sim x$, so the consequent may be separated as a theorem:

(4) $\forall_{x,y}(x \sim y)$.

Similarity appears to be a reflexive relation. Everything points to the fact that within the theory of abstraction the understanding of 'identity' is in accordance with Leibniz's detailed description. Conclusion (4) seems to have solid grounds.

B.3. Similarity is usually understood as a symmetrical relation. Is it also the case in the theory of abstraction? Here we must proceed with caution, as psychologists have discovered that our concept of similarity does not always imply symmetry. Let us use the following two examples: It is easy to see that a son may be similar to his father. However, we might hesitate for a moment if we are to state that a father is similar to his son (the time of reacting to such a question is longer). Similarly, we have no difficulty stating that a hen is similar to a swan. However, a statement that a swan is similar to a hen seems to be inappropriate and to be somehow insulting to the swan. It appears, therefore, that in both the abovementioned cases the order of items compared is not arbitrary. The similarity of a derivative to a source raises no doubts, but the similarity of a source to something 'less perfect' seems questionable. If people indeed use two different notions of similarity, then we need to specify which type is employed in the theory of abstraction and constitutes the basis for the theory of generalities.

B4. Theorem (l) specifies that when two items are similar, they belong to some generalities. Let us now consider this conclusion from the opposite point of view: are all items belonging to some generalities similar, or can these generalities also include items which are not similar? Consider the following example: An orange and a ripe peach can be considered similar. They are fruits, both of them orange in hue, etc. They belong to at least one common generality. Is it possible for this generality to include e.g. a crocodile? It is not orange, it is not a fruit, but it is a living organism. In this last respect, a crocodile is indeed similar to an orange. It is much more difficult to assume that a primary number is somehow similar to a ripe peach. Especially if we decide that the generality should additionally include an exemplary specimen of a pumpkin, a specific tomato, the ribbon worn by Yushchenko's supporters during the 2005 election in Ukraine, and many other very different items. The point of similarity between our primary number to all the mentioned objects would become more and more difficult to find — it can, however, be done by assuming that all of the mentioned elements of the generality are 'beings'. If we exclude the primary number, the

similar aspect of all the items becomes more apparent — it may be assumed that the elements of this generality are similar with regard to their colour (orange). It appears that this is what is normally assumed within the theory of abstraction: items belonging to one generality are similar, even if the aspect of their likeness is not easy to find. These conclusions pertaining to the theory of abstraction allow us to assume the theorem reciprocal to (1) to be true:

(5) $\forall_{x,y,z}(x\in z \wedge y\in z \Rightarrow x\sim y \Rightarrow x\neq y)$.

B.5. Having introduced an additional direct description of a generality, we may return to the issue of symmetry in similarity, i.e. to an indirect description of a generality. After we discard the second index in the consequent of the implication in (5) through renaming the variables, we may arrive at an equivalent formula, the so-called alphabetical variant:

(6) $\forall_{x,y,z}(y\in z \wedge x\in z \Rightarrow y\sim x)$.

After discarding quantifiers from (5) and (6) we arrive at:

(7) $x\in z \wedge y\in z \Rightarrow x\sim y$
(8) $y\in z \wedge x\in z \Rightarrow y\sim x$

If we take the propositional calculus:

$$(p\Rightarrow q \Rightarrow r) \wedge (q\Rightarrow p \Rightarrow s) \Rightarrow [(p\Rightarrow q) \Rightarrow (r\Rightarrow s)]$$

and make the following substitutions: $p/x\epsilon z$, $q/y\epsilon z$, $r/x\sim y$, $s/y\sim x$, then after separating (7) and (8) and adding quantifiers we arrive at the formula:

(9) $\forall_{x,y,z}[x\in z \wedge y\in z \Rightarrow (x\sim y \Rightarrow y\sim x)]$.

This conclusion inferred from earlier premises demonstrates that similarity is symmetrical, but only within a generality. The reflexiveness is not limited.

B.6. Let us now consider the issue of transitivity of the property of similarity. It is usually assumed that similarity is transitive. However, there are some cases that raise suspicion. For example, a son may be similar to his father, the father to the grandfather and the grandfather to the great-grandfather — however, the son may not be similar to the great-grandfather

at all. This example demonstrates that similarity is not always transitive. Again, we need to ascertain how this property is to be understood within the framework of the theory of abstraction.

As before, we shall treat theorem (6) as the basis for further inference. This time we will create three equivalent alphabetical variants, with quantification removed right from the start. Thus, we begin with:

(10) $x\in t \wedge z\in t \Rightarrow x\sim z$,
(11) $y\in t \wedge z\in t \Rightarrow y\sim z$,

We also have the already mentioned formula (7) after the substitution z/t:

(7) $x\in t \wedge y\in t \Rightarrow x\sim y$.

We can take the propositional calculus $[(p \Rightarrow q \Rightarrow r) \leftrightarrow (p \Rightarrow s \Rightarrow t)] \wedge [(p \Rightarrow \mathrm{q} \Rightarrow r) \leftrightarrow (q \Rightarrow s \Rightarrow p')] \wedge [(p \Rightarrow s \Rightarrow p') \leftrightarrow (p \Rightarrow s \Rightarrow t)] \leftrightarrow [(p \Rightarrow q \Rightarrow s) \Rightarrow (r \Rightarrow p' \Rightarrow t)]$ and make the following substitutions: $p/x\epsilon t$, $q/y\epsilon t$, $r/x\sim y$, $s/z\epsilon t$, $t'/x\sim z$, $p'/y\sim z$. After isolating (7), (10) and (11) and adding quantifiers we arrive at:

(12) $\forall_{x,y,z,t}[x\in t \wedge y\in t \wedge z\in t \Rightarrow (x\sim y \wedge y\sim z \Rightarrow x\sim z)]$.

The latter theorem suggests that similarity is transitive, but the transitivity occurs only within the generality to which all analysed items belong. The theory does not speak of the similarity of items that do not belong to some common generality.

C.1. So far we have not discussed the second part of the theory of abstraction, namely the aspect pertaining to omitting attributes that are not common for all analysed items. This subject is more complex than our previous considerations. The theory of abstraction aims at describing generalities or, more colloquially, features. The second part of the theory specifies the conditions for arriving at a generality — these conditions include omitting certain generalities. It may be argued that the theory tries to define the concept of 'generality' using the same concept in the definition. Such a description would, of course, be a vicious circle. Such a logical fallacy appears relatively often in philosophical analyses, i.e. the first attempts at describing the world in general and our cognition. Should the accusation of fallacy prove justified, we would have to rid our reconstruction of this error,

even though we only introduce partial definitions and not equivalents.

It appears that in our particular case there are several ways to avoid defining *ignotum per ignotum*. The simplest of them involves substituting the phrase 'omit generalities' with some remark pertaining to similarity or dissimilarity. Let us employ this method, as it seems nearly self-evident.

C. 2. The search for a solution that would allow us to avoid defining *ignotum per ignotum* will naturally be based on the theory of abstraction, as it is the only source of information regarding the theory. What attributes are omitted in the process of identifying a characteristic? We disregard those features which are not common to all the analysed items. The items under analysis are only similar if they belong to some common generality. It seems justified to ask what attributes are not common for analysed items. Most probably these features cause the items to be dissimilar to one another. A new difficulty arises: the items we are comparing are similar but — since some of their attributes must be disregarded — also dissimilar. There seems to be only one way out of this contradiction, namely introducing a new concept that of 'similarity in some respect'. Such similarity would be a relation with three arguments, occurring between the two compared items and the 'respect' in which they are similar, which may in fact be an attribute. Again, we run the risk of defining *ignotum per ignotum*. Since this risk is not imminent, we cannot exclude the possibility of introducing this tri-argumentative notion of similarity in our further considerations. For the time being, however, we shall try to make do with the concept of similarity that was employed before.

C.3. As noted above, for the time being we shall focus on the dissimilarities. In the theory of abstraction, if we disregard some attribute, this means that this characteristic is not present in all of the items under consideration. There exists items that are not similar to those under analysis. The fact that many of the analysed items lack a given attribute is irrelevant. It must be remembered that our analysis does not concentrate on the cognitive processes mentioned in the theory of abstraction, but focuses on the assumptions this theory makes with regard to the reality that is the subject of cognition*. In order to disregard the attributes that do not occur in all of the objects under consideration, we must assume that such attributes do exist. By the same token, we assume that there are items that are not similar to any of the objects under analysis.

This condition is not only basic, it also allows us to avoid the fallacy of *ignotum per ignotum* in defining a generality. In view of this conclusion we may assume that if two separate items x and y are similar and belong to a given generality, and item z is not similar to x or y, then z does not belong

to the generality in question. This conclusion may be presented as a very simplified version of the ontological basis for the second part of the theory of abstraction:

(13) $\forall_{x,y,z,t}\{x{\sim}y \Rightarrow x{\neq}y \Rightarrow x{\in}\ t \wedge [\neg(x{\sim}z) \vee \neg(y{\sim}z)] \Rightarrow\ \neg(z{\in}\ t)\}$.

Premise (13) specifies the conditions in which a given object does not belong to the generality *t*. Premise (1) tells us under what circumstances a given item belongs to the generality *t*. However, these theorems specify only the conditions for belonging or not belonging to the generality t – they do not state whether or not these conditions ever occur. Since it is generalities that are being investigated, it would suggest that the mentioned conditions are presumed to occur without any doubt. They are simple. Fulfilling the condition specified in (1) involves:

(14) $\forall_x\exists_y(x{\neq}y \wedge x{\sim}y)$.
(15) $\forall_x\exists_y\neg(x{\sim}y)$.

Every time we make abstractions, we are dealing with at least two items that are similar. If in the process of abstraction we disregard a certain attribute, we assume that this is possible, in other words, we assume the existence of items which are not similar to the source object that was the starting point of our comparison.

D.1. Ancient Greek realists attributed the property of realness to species, types, essences and attributes in general. They sometimes referred to such items as 'beings'. They claimed that if a given item is real and belongs to some generality, then this generality — as pertaining to real items — is also real. This conclusion may provisionally be presented as follows:

$\exists_x(x$ is real $\wedge\ x\epsilon y \Rightarrow\ y$ is real$)$.

To define the notion of realness in more detail, we need to analyse the concept of being. Since the times of Parmenides it has been emphasised that being is equivalent to itself. Philosophers who polemised with Heraclitus' views claimed that reality is not contradictory. Heraclitus was believed to claim that all that is real is changeable, whereas changeability stems from contradiction. These two properties (equivalence and non-contradictoriness of being) were highly emphasised by Aristotle. Parmenides contented himself with equivalence and non-contradictoriness as defining attributes of being.

Aristotle, however, does not seem to have regarded these two characteristics as adequate conditions for realness — for being a 'being'. According to this identity-based and non-contradictory description of being, a square circle cannot be considered a (real) being, yet Zeus' septuplets (that never existed) could be real, if only they were non-contradictory. In Aristotle's view a real being implicitly had to act, be the subject of some actions or be involved in (causative) activity in some other way. This condition was never emphasised, but often tacitly accepted as self-evident. How should we combine these two types of conditions in a way that would not stray too far from the customary interpretation of Aristotle's views? It seems that the best course of action involves treating the statement of the activity of being as a condition of a partial definition, whose consequent is a definitional equation that makes 'being a being' equivalent with identity and non-contradictoriness. This concept could be provisionally presented as:

$$x \text{ is a factor in some activity} \Rightarrow [x \text{ is a being} \leftrightarrow x{=}x \wedge \neg (x{\neq} x)].$$

The issue of activity as an ontological condition for being a being shall not be further discussed in the present article. We lack the means to analyse it, moreover, it has traditionally been treated as implicit. It is sufficient for our purposes to mention the definitional equation that makes beingness equivalent to identity and non-contradictoriness and implicitly states that activity (and thus change) does not cause contradiction — as in Hegel's philosophy. The expression *x is a being* will not be presented using the usual notation with the symbol of belonging to a set (ϵ). The definition behind this symbol is based on the concept of similarity, which is not present in the definition of beingness. A being ought to be defined only through identity and non-contradictoriness; it does not need the symbol ϵ. The sentence *x is a being* shall be presented as: Being(x). Thus, the definition of beingness may be specified using the formula:

$$(16) \quad \text{Being}(x) \leftrightarrow \neg x{\neq}x \Rightarrow x{=}x$$

In the light of our logic both conditions of the definiens are logically equivalent. In the past it was not known that they imply one another, therefore the two were treated as independent ontic truths. The properties of beings and real creations are sensibly stated; all real items possess some properties. Beingness is the basis for having attributes — it is the necessary condition for having properties. Thus, another feature of being may be

identified as:

(17) $\exists_y(x \epsilon y) \Rightarrow \text{Being}(x)$.

Thus, having attributes, belonging to a certain generality and possibility if stating this fact is a sufficient condition for beingness. It is now time to return to ascertaining whether generalities are real. It must be remembered that essences, species and all types of attributes were regarded as inherent in the substance. Their realness was guaranteed by their connection with substances or, more generally, with previously acknowledged beings. Our generalities are in the same position as these essences etc. Generalities are connected with real objects – the relation between them is that of belonging. In other words:

(18) $\forall_{y,x}[\text{Being}(y) \wedge y \epsilon x \Rightarrow \text{Being}(x)]$.

Including an element (elements) is a sufficient condition for generality x to be real. It must be remembered that the concept of generality is introduced using the notion of similarity, which has hitherto constituted the main topic of our discussion. It should therefore come as no surprise that Aristotle, who introduced the concept of being through the notions of identity and non-contradictoriness, did not consider being to be a generality, but a so-called 'transcendental'. The concept of being is transcendental and is related to the fact that (in terms of modern logic) it is systematically ambiguous. The concept of systematic ambiguity was introduced by Bertrand Russell in his theory of types. Here this notion is even more general, as it goes beyond types and pertains to categories (which may be interpreted in many different ways, e.g. as situations or states of being). The systematic ambiguity of variables coincides with analogical systematic ambiguity of constants, which in our case means the quantifier and the identity. When variables can be chosen from among the entire set of situations, then identity becomes (to use Roman Suszko's term) non-Fregean. We shall disregard this issue for the time being. Irrespective of their syntactic position (before or after the symbol of belonging) name-type variables have the same shape and do not change the logical type.

D.2. Can the concept of similarity be used to determine and distinguish something that would be an equivalent to the notion of both a 'universal set' and 'being'? An analysis of this issue may cast some more light on the relation between the concept of generality and being. Our definiendum will

be as follows: xϵUniv (x belongs to a universal generality). Item x belongs to this generality if the thesis is: $\forall_x$(xϵUniv). This possible thesis may be a criterion for accuracy of the definition of a universal generality. When can a generality be considered universal? If items are similar to x, then they belong to the same generality as x. If all items are similar to x, then all belong to one generality — a universal generality, which encompasses every item. It appears that the concept of similarity may be used to define the notion of universal generality. Thus, the definition of 'universal generality' is complete and consistent with our criterion:

(19) $\quad x \,\epsilon\, \text{Univ} \leftrightarrow\ \forall_y(x{\sim}y).$

This definition can easily provide the answer to the question of whether our definition leads to the criterion thesis. On the basis of the theory of abstraction we have made the assumption that: (15) $\forall_x\exists_y\neg(x{\sim}y)$, or $\forall_x\neg\forall_y(x{\sim}y)$. In this thesis it is possible to eliminate the general quantification related to x. We then arrive precisely at the negation of the definiens from (19). We therefore have to accept the negation of the definiendum (cf.$[p \leftrightarrow\ q] \wedge \neg q) \Rightarrow\ \neg p]$). This negation presented as a thesis is preceded by general quantification, which gives us:

(20) $\quad \forall_x\neg(x\epsilon\text{Univ}).$

The above thesis demonstrates that defining a universal generality, which is based on the intuitive notions of the theory of abstractions (cf. (15)) and fulfills the criterion condition (a universal generality encompasses all items), proves impossible. This conclusion may disappoint modern theoreticians dealing with multiplicities, yet it is very much in accord with Aristotelean understanding of the concept of a generality. The syllogistics of that time could not include universal names, which made it impossible to speak of a universal generality. Perhaps the most peculiar aspect of this logic is the fact that the universal generality, which was supposed to encompass all items, proved to be completely empty. This conclusion corroborates our analysis. There is, however, one more surprising fact pertaining to the universal generality. The notion of universal generality has been defined in a way that, according to the conventions we have applied, enables us to use its name as a substitute for any name-type variable in any given position. For example, it is possible to substitute x with Univ in theorem* (18). We then have:

(21) $\text{Being}(y) \wedge y\epsilon\text{Univ} \Rightarrow \text{Being}(\text{Univ})$.

However, we have inferred from (20) that $\neg y\epsilon\text{Univ}$. For this reason, it is not possible to eliminate the consequent Being (Univ). Thus, we cannot determine whether the generality is a being or not. Moreover, since being is not-contradictory, it is not possible to ascertain whether a universal generality is non-contradictory. As we do not differentiate various name types, a universal generality could prove paradoxical and thus contradictory. Could Aristotle have sensed this danger and therefore excluded universal names and the corresponding generality from his logic? It is difficult to ascertain. We only know for a fact that Aristotle did not want such names in his system. The reasons for this exclusion shall be analysed in another section of the present article.

D.3. Syllogistics cannot include empty names. If we wish to determine whether our understanding of ontic principles in the theory of abstraction is correct, we need to arbitrate whether it is possible to analyse an empty generality on the manner presented above. Let us start with formulating a criterion thesis for empty generality. It might be assumed that an empty generality is one that has no elements belonging to it. Our criterion would thus look as follows:

$\forall_x \neg(x\epsilon\text{Empt})$

How can the concept of an empty generality be determined on the basis of the notion of similarity, i.e. the intuitive assumptions of the theory of abstraction? If our Empt has no elements, then x would belong to Empt only if x was not similar to anything. Thus, x does not fulfill the primary condition for belonging to a generality and the empty generality would indeed be empty. If this is so, the definition of an empty generality might be presented as:

(22) $x\epsilon\text{Empt} \leftrightarrow \neg\exists_y(x{\sim}y)$.

It must be remembered that we have already proven that similarity is reflexive (cf. (4)): $\text{V}_x\ (x{=}x)$. On the basis of the so-called existential generalisation it is possible to formulate the following thesis:

(23) $\exists_y(x{\sim}y)$

If we negate both sides of the existential equivalence from (22), we will arrive at:

(24) $\neg(x\epsilon\text{Empt}) \leftrightarrow \exists_y(x{\sim}y)$.

The right side of the equivalence is equivalent to (23), therefore it is possible to separate the left side of the equivalence and precede it with general quantification.

(25) $\forall_x\neg(x\epsilon\text{Empt})$.

The definition of an empty set fulfills our criterion, specified in theorem (25). It appears that despite allowing us to define an empty generality, the theory of abstraction is not entirely consistent with the guidelines of those syllogistics that do not acknowledge the concept of empty generalities. Nonetheless, our analysis does not end here. Let us consider a weaker version of (5), i.e. $t\ \forall_{x,y,z}(x\epsilon z \Rightarrow y\epsilon z \Rightarrow x{\sim}y)$. If we eliminate quantification, substitute x/y and dispense with one of the repeated elements of the conjunction in the consequent, we arrive at:

(26) $x\epsilon z \Rightarrow x{\sim}x$.

If the consequent of (26) implies that $\exists_y(x{\sim}y)$, then — due to the transitivity of implication — it is possible to infer that:

(27) $x\epsilon z \Rightarrow \exists_y(x{\sim}y)$.

Let us substitute z with Empt. The result is:

(28) $x\epsilon\text{Empt} \Rightarrow \exists_y(x{\sim}y)$.

The rules of transposition allow us to transform theorem (27) into:

(29) $\neg\exists_y(x{\sim}y) \Rightarrow \neg(x\epsilon\text{Empt})$.

Combining (22) with (28) gives us:

(30) $\forall_x[x\epsilon\text{Empt} \Rightarrow \neg\exists_y(x{\sim}y) \wedge \exists_x(x{\sim}y)]$.

Assuming that some item belongs to an empty set immediately leads to a contradiction. To us it comes as no surprise, yet ancient scholars must have found this conclusion unsettling.

More important conclusions were inferred by Aristotle from theorems (18) and (25). If we eliminate the quantifiers from (18) and substitute x with Empt, we arrive at:

$$[\text{Being}(y) \wedge y\epsilon\text{Empt} \Rightarrow \text{Being}(\text{Empt}).$$

We can do the same with (25), which gives us:

$$\neg(y\epsilon\text{Empt}).$$

If we collate the transformed versions of (18) and (25), the result will look as follows:

$$(31) \quad \text{Being}(y) \wedge [y\epsilon\text{Empt} \wedge \neg(y\epsilon\text{Empt})] \Rightarrow \text{Being}(\text{Empt}).$$

The antecedent of this theorem contains a contradiction. Thus, we are not able to separate the conclusion that an empty generality is a being. We encounter the same problem as in the case of a universal generality: it is not possible to establish that both these generalities are beings and, as such, can be the subject of discussion.

E.1. In Aristotle's syllogistics there is no place for proper and individual names. As Boole broke the prohibition of using universal and empty names in logic, so Leibniz disregarded the restriction pertaining to including individual names in syllogistics. Leibniz's concepts of monads related to individual beings mentioned by Duns Scotus. Thus, the concept of a generality — encompassing both empty and universal sets — became more and more general, even though it did not reach the contemporary level of universality. Why did Aristotle narrow the concept of a generality so much, excluding e.g. unit sets? We shall now try to answer this question.

E.2. Let us supplement the abovementioned analysis with remarks regarding philosophy. Aristotle (and not only him) was interested in scientific topics which he regarded universal. He concentrated on essences — closely connected with forms, i.e. with the dynamic principles of that which is repetitive. For him, individual items were dependent on the form, not *vice versa*. This might be the reason why Aristotle never paid much attention to the relation of belonging that occurs between the individual and a given

essence. In comparison with the relation of determining observables between the form and the substantial being, belonging seemed a secondary notion. Dealing with the scientific — the repetitive — meant that Aristotle had no inclination to be interested in what is now called individual essence. So was the philosophical background behind some of the limitations of the concept of a generality introduced in ancient Greece. We aim at considering the issue from the point of view of logic, therefore the above considerations ought to be treated only as an informal introduction.

Irrespective of the philosophical determinants, a singleton is defined as a generality with only one element: whatever belongs to it, must be identical with this element. If we agree to represent a singleton containing the element x with $\mathrm{J}(z)$, then a definition of a unit set may be presented as:

$$(32) \quad x\epsilon\mathrm{J}(z) \leftrightarrow [x\epsilon z \Rightarrow \mathrm{V}_y(y\epsilon z \Rightarrow x{=}y)].$$

This definition has been the subject of an ontological debate. Controversial issues include the question of whether each item belongs to its own unit set. Theoreticians dealing with multiplicities unanimously claim that it is so. The opinion of Duns Scotus, the 'discoverer' of unit sets, is not known. Quantum physicists agree that all elementary particles of the same type are exactly the same and thus have no individual attributes (generalities). According to them, this very feature is the basis for quantum theory. Such issues, significant as they may be, lie beyond the scope of the present article. We shall only focus on determining the reasons for excluding individual names of the same type as $\mathrm{J}(z)$ from Aristotelean logic. The argument in favour of disregarding universal generalities and empty sets was that such generalities could not be proven to be beings. Let us try to ascertain whether the same is true in the case of unit generalities. In a word, if it is not possible to prove that $\mathrm{Being}(\mathrm{J}(z))$, then we will have to admit that $\mathrm{J}(z)$ cannot be a subject of consideration.

E.3. Our previous analysis regarding the non-beingness of empty and universal generalities was based on theorem (18). Let us employ this method one more time. In the case of unit sets theorem (18) takes the following form:

$$(33) \quad \mathrm{Being}(y) \wedge y\epsilon\mathrm{J}(z) \Rightarrow \mathrm{Being}(\mathrm{J}(z)).$$

Our previous analysis demonstrated that the second element of the antecedent of the substitutions in theorem (14) is not fulfilled, and thus

the consequent cannot be isolated. We shall now use the same method and attempt to prove that there are no items which would belong to unit generalities: $\neg y \epsilon \mathrm{J}(z)$.

E.4. We have already established that the characteristics of a generality may be presented as theorems (1) and (5). A combination of these principles looks as follows:

(34) $\quad \forall_{x,y}[\exists_z(x \epsilon z \Rightarrow y \epsilon z) \leftrightarrow \ (x \sim y \Rightarrow x \neq y)]$.

Our inventory of theorem also includes (14): $\forall_x \exists_z (x \neq y \Rightarrow x \sim y)]$. What conclusions can be drawn from theorems (34) and (14)? Since (34) is an equivalence and (14) states that one side of this equivalence does occur, we may accept that the conjunction of both these theorems is a thesis as well (we base our analysis on $[(p \leftrightarrow \ q) \wedge q] \Rightarrow \ (p \Rightarrow q)$, but do not mention self-evident substitutions and simple operations regarding quantifiers):

(35) $\quad \forall_{x,y}[\exists_z(x \epsilon z \Rightarrow y \epsilon z) \wedge (x \neq y \Rightarrow x \sim y)]$.

If we dispose of the last element in this conjunction, we arrive at:

(36) $\quad \forall_{x,y}[\exists_z(x \epsilon z \Rightarrow y \epsilon z) \wedge (x \neq y)]$.

If we use a simple theory of sentences, namely $(p \Rightarrow \neg q) \Rightarrow \ \neg(p \Rightarrow \ q)$, and make the necessary substitutions and dispose of (36), we arrive at:

(37) $\quad \neg[\ \exists_z(x \epsilon z \Rightarrow y \ \epsilon z) \Rightarrow \ x = y]$, or $\neg \forall_z (x \epsilon z \Rightarrow y \epsilon z \Rightarrow \ x = y)$.

A further observation regarding equivalence allows us to assume that:

(38) $\quad \exists_z \neg (x \epsilon z \wedge y \epsilon z \Rightarrow \ x = y)$.

Adding a general quantifier binding y and making it weaker gives us:

(39) $\quad \exists_{y,z} \neg \ (x \epsilon z \Rightarrow y \epsilon z \Rightarrow \ x = y)$.

Let us now perform all small transformations of the definition of a unit generality, namely theorem (32). The changes shall not be described elucidated one by one.

(40) $x \epsilon \mathrm{J}(z) \leftrightarrow \forall_y[x\epsilon z \Rightarrow (y\epsilon z \Rightarrow x{=}y)]$.
(41) $x \epsilon \mathrm{J}(z) \leftrightarrow \forall_y(x\epsilon z \Rightarrow y\epsilon z \Rightarrow x{=}y)$.
(42) $\forall_z[x \epsilon \mathrm{J}(z)] \leftrightarrow \forall_{z,y}(x\epsilon z \Rightarrow y\epsilon z \Rightarrow x{=}y)$.
(43) $\forall_z[x \epsilon \mathrm{J}(z)] \leftrightarrow \forall_{y,z}(x\epsilon z \Rightarrow y\epsilon z \Rightarrow x{=}y)$.
(44) $\neg\forall_z[x \epsilon \mathrm{J}(z)] \leftrightarrow \neg\forall_y\neg\forall_z(x\epsilon z \Rightarrow y\epsilon z \Rightarrow x{=}y)$.
(45) $\neg\forall_z[x \epsilon \mathrm{J}(z)] \leftrightarrow \neg\,\exists_y\neg\forall_z(x\epsilon z \Rightarrow y\epsilon z \Rightarrow x{=}y)$.
(46) $\neg\forall_z[x \epsilon \mathrm{J}(z)] \leftrightarrow \neg\,\exists_y\neg\,\exists_z(x\epsilon z \Rightarrow y\epsilon z \Rightarrow x{=}y)$.

The right side of the equivalence (46) is identical with theorem (39). Thus, the left side may be isolated as a thesis:

(47) $\neg\forall_z[x\epsilon\mathrm{J}(z)]$, or $\forall_x\neg\forall_z[x\epsilon\mathrm{J}(z)]$.

E. 5. We may now return to (33). After replacing y with x we see that the antecedent cannot be isolated, because its second element is not consistent with (47). We cannot arrive at the thesis: Being(J(z)). As in the case of universal and empty generalities, it may be assumed that Aristotle did not allow individual names to be introduced into his syllogistics and the theory of direct inference precisely because it was impossible to prove that unit generalities (individual essences) are beings. Our suppositions are, however, very general and require further analysis.

F.1. Aristotle was a realist. This fact may be relevant in our search for the reason of his decision to exclude universal names, empty names and individual names from his logic. Let us go back to theorem (17):

(17) $\exists_y(x\epsilon y) \Rightarrow \mathrm{Being}(x)$.

This ontological thesis contains no information as to what may or may not be done in the course of cognitive linguistic actions. As a realist, Aristotle thought that the role of cognition and speech was to reflect reality. It may therefore be surmised that he associated premise (17) with some theorem regarding the relation of the sentences describing the antecedent and the consequent of theorem (17). His theses or principles ought to include some meta-linguistic equivalent of (17).

F. 2. What linguistic actions could this equivalent describe? First of all, such an equivalent ought to mention correctness of language. Within this logic syllogistic sentences that contain universal, individual or empty names are deemed incorrect. This 'incorrectness' does not stem only from improper syntax. Aristotle seems to have acknowledged that the sentence:

Aristotle is not a barbarian is grammatically correct. However, in terms of syllogistics this utterance is erroneous. Without conducting very specific historical research it would be difficult to ascertain the precise nature of this incorrectness. What we know for fact is that the error is related to the context of Aristotle's analysis, which is now uncertain.

The mentioned equivalent of theorem (17) should also include the concept of proof or, more generally, justification. Aristotle's understanding of this term was, naturally, very different from the modern definition. These differences shall now become the subject of a brief analysis.

To make our reasoning clearer, we shall introduce the following abbreviations: Symbols $\ulcorner\ \urcorner$ will be used to represent Quine's quasi-quotation marks which enable the transition from the language of ontology to meta-language. The symbol # shall signify that the following formula is correct from the point of view of scientific discourse (by this we mostly mean syllogistics). The symbol * will suggest that the formula which follows it is well justified. The meaning of the concepts behind the latter two symbols will not be further specified.

F.3. After the transposition, theorem (17) takes the following form:

$$(48) \qquad \neg\mathrm{Being}(x) \Rightarrow\ \neg\exists_y(x\epsilon y).$$

This thesis has a meta-linguistic and methodological equivalent. If the thesis that x is a being is not justified, no statement regarding x may be formulated in a correct manner:

$$(49) \qquad \neg{}^*{\ulcorner}\mathrm{Being}(x){\urcorner} \Rightarrow\ \neg\exists_y\#{\ulcorner}x\epsilon y{\urcorner}.$$

Despite its lack of clarity, this rather unspecific formula allows us to see the difference between certain issues. For example, Dummett appears to conclude that if a sentence cannot be justified, it cannot be regarded as true or false. Thus, he postulates that such a sentence is in a way faulty. This notion may be considered to fall within the scope of our symbol #. Dummett's principle may therefore be presented as:

$$(50) \qquad \neg{}^*{\ulcorner}x\epsilon y\ {\urcorner} \Rightarrow\ \neg\#{\ulcorner}x\epsilon y{\urcorner}.$$

There seems to be no grounds to believe that Dummett questions the principle assumed by Aristotle:

(51) $\exists_y \#\ulcorner x \epsilon y \urcorner \Rightarrow\ {}^*\ulcorner \mathrm{Being}(x) \urcorner$

The combination of (50) and (51) is not enough to justify the beingness (realness) of item x on the basis of the justifiability of a sentence (e.g. sentence $\ulcorner x \epsilon y \urcorner$). For this reason, Dummett's views may be regarded as very weak anti-realism.

F.4. The possible advantages of principle (49) (which is still very imprecise) shall no longer be discussed. What remains to be emphasised is that this theorem provides us with a plausible reason for the fact that Aristotle's logic contains no universal, empty or individual names. It may therefore be assumed that our analysis of the theory of abstraction is adequate, if its adequacy depends on the ability to explain why the syllogistics (i.e. the scientific discourse) of Aristotle's contemporaries did not include universal, empty and individual names.

G.1. From the perspective of modern set theory, Aristotle's understanding of the concept of a generality is very limited and thus of little use. Can it really be regarded as the actual origin of our theory of multiplicities, or should it be considered worthless, erroneous and downright expendable?

G.2. The answer to the above question depends on whether some form of the concept of a generality is embedded in the modern theory of multiplicities; whether some element of this notion (the concept of a generality) can be saved without disproving all.

G.3. The greatest limitation of the concept of a generality is the fact that it disregards universal, empty and unit sets. The prohibition of employing these concepts was mostly based on theorems (14), (15) and definitions of a generality – (1) and (5). The main conclusion stemming from the theorems is that all different items are similar to some item and that each item must also be dissimilar to something. Without these premises it is impossible to prove that universal, empty and individual generalities have no justification for their beingness. Abandoning these theses — which are not fully self-evident — results in the possibility of introducing a prohibition against ideas including the concepts of universal, empty and individual generalities in scientific discourse, i.e. against expanding the notion of a generality. In a word: the concept of a generality may be modified so that the essence remains intact. The modern theory of multiplicities is, after all, based on the ancient notion of a generality.

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TRUTH AND MEANING

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§1. INTRODUCTION

Truth and meaning are perhaps the most important notions of logical semantics. This is why so much weight is attached to their mutual relationship. This query is considered in this article, primarily within the frame of the semantic definition of truth (later: **STT**), formulated by Alfred Tarski in the early 1930's (Tarski 1933); the remarks on other concepts will be marginal. In one particular sense, my reflections might be seen as a comment to Tarski's (1933: 166-167) following words:

> It remains perhaps to add that we are not interested here in 'formal' languages and sciences in one special sense of the word 'formal', namely sciences to the signs and expressions of which no material sense is attached. For such sciences the problem here discussed [i.e., the definition of truth — J.W.] has no relevance, it is not even meaningful. We shall always ascribe quite concrete and, for us, intelligible meanings to the signs which occur in the languages we shall consider. The expressions which we call sentences still remain sentences after the signs which occur in them have been translated into colloquial language. The sentences which are distinguished as axioms seem to us to be materially true, and in choosing rules of inference we are always guided by the principle that when such rules are applied to true sentences the sentences obtained by their use should also be true.

Several years later he observed (Tarski 1969: 67):

> When carrying through this analysis, we notice at once an outstanding feature of this language — its all-comprehensive, universal character. The common language is universal

and is intended to be so. It is supposed to provide adequate facilities for expressing everything that can be expressed at all, in any language whatsoever; it is continually expanding to satisfy this requirement.

Nonetheless, these fragments are only a starting point for the discussion of the problem of truth and meaning on the grounds of **STT**. Tarski himself decidedly avoided to take a clear standpoint on what meaning is. It is true, he noticed (Tarski 1933) that the meaning of every expression in a formalized language is pre-determined by its form, but this does not say much. Some light on this was shed by the debate between Tarski and Kokoszyńska during the Third Polish Conference of Philosophy in Cracow, in 1936 (Kokoszyńska 1936; Tarski 1936a). According to Kokoszyńska, the notion of truth should be relativized to meanings. Tarski replied, it would be better to relativize to the language because of its notion being simpler than the one of meaning. In response to that, Kokoszyńska said that the notion of truth must be relativized to the groups of sounds and to the way how they are translated into the meta-language in which the truth has been formulated. Tarski's reticence about the notion of meaning was understandable. He was a convinced nominalist, and some of the Polish discussions about meaning, in particular the works of Ajdukiewicz (1931, 1934), suggested that treating senses (I am using "sense" and "meaning" interchangeably) as ideal objects is inevitable. Thus, the concept of an interpreted language, i.e. such whose expressions already have assigned meanings, becomes a convenient starting-point, it gets even more so because formal semantics does not need anything more. But a philosopher is not necessarily contented with such a minimalism. Hence the need appears for further reflections on the nature of the relationship between truth and meaning.[1]

§2. SOME GENERAL REMARKS ON SEMIOTICS, MEANING AND LANGUAGE[2]

Semiotics embraces various reflections concerning signs.[3] When adding the qualification "logical", we point to the aim that we want to consider signs from a logical point of view. Logical semiotics is, apart from formal logic

[1]The content of the present paper is meant to amplify and systematize what I had to say on this subject in my previous works, in particular in Woleński (1997), and Woleński (2005: 274-289, 470-478). Some parts of the latter are repeated *in extenso*.

[2]This paragraph is of an entirely elementary character, and it aims to give a certain perspective for further discussion.

[3]Cf. Pelc (1982) on semiotics and its subject.

and methodology of science, a part of logic in a broad sense, and it describes linguistic signs, that is — expressions. The classical division of logical semiotics (Morris 1938) differentiates within it syntax (syntactics), semantics, and pragmatics, so far as it corresponds to the three elements of the semiotic situation of a language (semiosis): to the expression as a material object, i.e. the carrier of the sign, to the expression's appliance to its denotation, and to the interpreter. Briefly: expressions as signs are always particular objects and signs of something and to someone. From this it follows that a syntactic approach concerns the relations between linguistic expressions as regards their form and abstracted from their meanings, semantics deals with the relations of expressions to their denotata, and pragmatics has as its subject the users' attitudes to the linguistic expressions they use. Syntactic connexity is a syntactic notion, denotation and truth (in particular as regards **STT**) belong to semantics, uttering to pragmatics.[4] The syntax-semantics-pragmatics ordering corresponds to moving from simpler to more complicated matters. In fact, a syntactic description of language is the simplest one (it concerns exclusively the carriers of signs and their mutual relationships), a semantic description is more complicated (it deals with the relationships between signs and something else), but a pragmatic description requires a further enlargement of the conceptual apparatus in pragmatic categories. But, the right order is another one, regarding what has been said above, that signs are always particular objects and signs of something and to someone, and every language is used by someone to something, that is, it has an unremovable pragmatic aspect. Morris (1938: 84-85) has presented the parts of semiotics as a semantic-pragmatic-syntactic ordering, Carnap (1939: 5-21) successively used pragmatics-semantics-syntax. The reason is simple. Semantics arises as an effect of abstraction from the pragmatic aspect of language, and syntax omits the semantic element.

No notion of meaning has been used in order to present semiotics and its divisions above. This may be surprising, because the natural way to determine a sign consists in showing it as an object having a meaning, i.e. a property to be understood in a certain way, in particular, we are able to

[4]We have to notice a certain ambiguity in the words "syntax," "semantics," and "pragmatics." In the first place, they refer to theories or sciences concerning respectively syntactic, semantic, or pragmatic relationships, in the second place, to particular properties of language (cf. Pelc 1982, part III on $semiotics_T$, i.e. theoretical semiotics, or of $semiotics_P$, i.e. semiotic properties). In this connection, if speaking about semantics (syntax, or pragmatics) of a language **L**, we may think either of a semantic (syntactic, or pragmatic) description of the properties of this language, or of the properties themselves.

think of objects perceived through signs, when we receive signs as objects. This fundamental property of signs is called their semantic transparency. However, at this point the following question arises: in which category does meaning belong – syntactic, semantic or the pragmatic one? When Tarski (see above) defined the sense of an expression as a function of its form, he appealed to syntax, when somebody reduces the connotation (meaning, sense) of a name to its denotation (as for instance Kripke does), he uses semantic apparatus (in the sense outlined above), or when he defines meaning as a use (as the late Wittgenstein), he remains on the grounds of pragmatics. Correspondingly, we observe a twofold aspect in handling semantics, well presented in the following passages:

> The word 'semantics' is used here in a narrower sense than usual. We shall understand by semantics the totality of considerations concerning those concepts which, roughly speaking, express certain connections between the expressions of a language and the objects [...] referred to by these expressions. As typical examples of semantical concepts we may mention the concepts of *denotation*, *satisfaction*, and *definition* [...] (Tarski 1936:401).

> When the cleavage between meaning and reference is properly heeded, the problems of what is loosely called semantics becomes separated into two provinces so fundamentally distinct as not to deserve a joint appellation at all. They may be called the *theory of meaning* and the *theory of reference*. 'Semantics' would be a good name for the theory of meaning, were it not for the fact that some of the best work in so-called semantics, notably Tarskis, belongs to the theory of reference. The main concepts in the theory of meaning, apart from meaning itself, are *synonymy* (or sameness of meaning), *significance* (or possession of meaning), and *analyticity* (or truth by virtue of meaning). Another is *entailment*, or analyticity of the conditional. The main concepts in the theory of reference are *naming*, *truth*, *denotation* (or truth-of), and *extension*. Another one is the notion of *values* of variables (Quine 1953:130).

Tarski's words "in a narrower sense than usual" refer to what is a common practice in linguistics. But, it is not just about the old way of handling semantics as examining meaning changes, it is about a widespread (rather now than 50 years ago) linguistic standard of understanding semantics as a theory of meaning, e.g., "Semantics is the study of linguistic meaning. It is concerned with what sentences and other linguistic objects express, not with the arrangement of their syntactic parts or with their pronunciation. Nearly everyone agrees on this. It is also generally agreed that the basic question

of semantics is 'What is meaning?" But at this point agreement ends and interminable controversies begin about what kind of thing meaning is." (Katz, 1972: 1); "Semantics is the branch of linguistics devoted to the investigation of linguistic meaning, the interpretation of expressions in a language system" (Chierchia, McConnell-Ginet 1990: 1); "[. . .] to begin our considerations on *s*emantics, that is, the science of the meaning of linguistic expressions" (Grzegorczykowa 1990: 9, transl. by K.K.); "semantics is the study of meaning communicated through language" (Sneed 1997:3); "semantics is the study of meaning" (Portner 2005: 1). This places the notion of meaning as the main category of semantics from the beginning. Contemporary linguists (e.g. Portner 2005) move even further when developing a research program for formal semantics based on the notion of meaning. But it has to be noticed that in some of the quotations above meaning is associated with uttering (Katz), i.e. with pragmatics, or (as in Chierchia, Mc Connell-Ginet) with interpretation. Katz' explanation does not contradict the distinctions made by Quine, whereas the one of Chierchia, Mc Connell-Ginet clearly differs from them, at least if the interpretation of an expression E should consist in defining its denotation. At this point it needs to be remarked that contemporary logical semantics might be identified with the model theory, i.e. with the theory of reference (the notion of model and interpretation is yet to be discussed below).[5] In fact, the concept of formal semantics is clear with regards to formalized languages, i.e. the ones based on strict syntactic rules, while its extension of natural (ordinary) languages is a matter of controversy on the grounds of philosophy and linguistics. On one hand, we observe a serious skepticism as regards applying formal methods to the analysis of ordinary speech, but on the other hand, every language, including the natural one, is said to be a formal system (Chomsky's thesis), or the natural language is said to be an interpreted formal language (Montague's thesis). Without going into too much detail, I assume that the program for formal semantics can be realized for large parts of the natural language, though not for the whole one.[6] The latter remark also applies to formalized

[5]Yet another ambiguity in the term 'semantics' should be pointed out. Sometimes, the meaning of 'semantics' and 'semiotics' is the same, or sometimes 'semantics' only is referred to what Quine called reference theory. Hence, semantics *sensu largo*, i.e. semiotics, and semantics *sensu stricte* , i.e. model theory must be distinguished.

[6]In respect to this question, Tarski's stand-point changed over the course of time. At first, he seriously doubted (Tarski 1933: 267) if a logical treating of a natural language is possible at all, but then (Tarski 1944: 346, Tarski 1969: 68) he admitted this with respect to fragments of this language, in particular to the ones connected with empirical sciences.

languages, in the sense that the formalization of a language **L** must be made in a not-formalized language (in this case in the meta-language **ML**), or in any language which is less formalized than the object-language.

Should semantics be the theory of meaning, then the definition of meaning becomes a fundamental one. The basic intuition on meaning as underlying understanding, and consequently communication, does not suffice. At this point, some difficulties arise, because meaning is still lacking a single generally accepted definition. Grzegorczykowa (1990: 9-19) distinguishes between meaning as thought (psychological approach), meaning as behaviour (behavioural approach), meaning as an ideal object (intentional approach, or, as we prefer to call it, "Platonian approach"), meaning as an object, or object properties (denotative-connotative approach, or, as we prefer to call it, "referential approach"), meaning as a relationship between expressions, and meaning as use (similar rubrics can be found in the typologies of other authors). Grzegorczykowa calls these approaches philosophical, and she remarks that within philosophy we meet similar theories. Horwich (1998: 52) lists the following ways of conceptualizing meaning: the definition (meaning derives from the definition specifying necessary and sufficient conditions for an expression's meaning), the mental image (meaning is reflected as a mental image associated with a given expression), the prototype (the meaning of an expression is its prototype, i.e., the use to which the expression correctly applies), the information (the meaning of a given expression is a piece of information conveyed by it), and the teleology (the meaning of an expression derives from its evolutionary function). Because in this article there is no place for discussing the individual views as regards the answer to the question "What is meaning?", I restrict myself to the lists given above, without having even roughly compared them with one another (see also Ogden, Richards 1923, Christensen 1961, Cohen 1962, Hill 1971, Chierchia, McConnell-Ginet 1970, Larson, Segal 1970, Sneed 1997, Cruse 2000, Portner 2005; the bibliography on the subject is an extensive one).

The controversies concerning meaning do not resolve themselves in definitional matters or in explaining its ontological nature. No less controversial are the postulates affecting the question what the theory of meaning should explain. Horwich (1998: 13) names the following constraints upon the conceptions of meaning: the clarification of how language is understood, the analysis of the expression "x means y" (the way words apply to the meaning), the interpretation of the way linguistic expressions represent the world, the clarification of both the conventional and the aprioristic nature of language, the clarification of compositionality (see below), the interpretation

of the normativity of language, and the answer to the question of what use of language is. Horwich himself calls them pseudo-constraints but it is certainly not a common view. Facing such deep-rooted difficulties and controversies on the question about meaning and its theory, it is not even surprising that logicians (Tarski is a good example here) refuse to choose one or another conception of truth, and they content themselves with semantics as model theory. Even if we admit their decision is reasonable, we may just wonder if a more specific answer to the question about meaning is essential for the theory of meaning. As it will be seen further, it is not needed to embrace one view on controversial questions concerning the notion of meaning.

As I have noticed above, formal semantics is relevant for formal languages. Non-formal languages are opposed to them. The first group follow, as regards their building and description, syntactic rules that are independent from the content or meaning of expressions, i.e. based on their mere form. Those of the second group are based, as regards their description (not their construction), on content or meaning. But there are three more kinds of oppositions (some of them have appeared in the formulations of Chomsky's thesis; see above): (A) natural — artificial language; (B) interpreted – non-interpreted language; (C) formalized — non-formalized language. As "natural language" we generally understand the ordinary language of everyday use, principally accessible for everyone, etc. To the natural language we oppose special languages which, unlike natural *language,* are constructed on purpose, for instance logical symbolism, Morse code alphabet, binary code, chemical symbols etc., that is, constructed languages replace ordinary speech in certain clearly defined situations. They have a well-defined structure, and their syntax is regular. A non-interpreted language is a language for which no rules assigning intensions or even mere extensions of its expressions are given. An interpreted language has such rules. And, finally, a formalized language is a language that is an effect of formalization, while a non-formalized language is the one that has never undergone a formalization process.

At first glance it may seem that we should identify the non-formality of a language plus the first elements of (A) — (C) with the formality plus the second parts of these oppositions. In this way, we obtain a characteristic of a language as natural, non-formal, interpreted, and non-formalized, on the one hand, and artificial, formal, non-interpreted, and formalized, on the other hand. I will not speak of the limitations of a formalization of ordinary speech as well as the question of artificialness, because this category has no contribution to the logical analysis. What remains are therefore the mutual relationships between formal, formalized and non-interpreted languages. We

can immediately see that this identification is erroneous, because a formalized language may be interpreted or not. Owing to that fact, the use of the adjective "formal" in respect to language needs a controlling decision. Every formal language is certainly formalized, but not conversely. We may arrange it so that we distinguish formalized interpreted, and formalized non-interpreted languages, we may also assume that we speak of formal interpreted, and formal non-interpreted (pure formal) languages, or we may even think of a formal language as a boundary case of formalization, i.e. the one for which interpretation is out of the question. Then, a formalized language would always be interpreted, a formal one would not. Each proposal has its advantages and disadvantages, but each excludes what we should avoid, namely, identifying formality with non-interpretativeness. From this ensues the fact that a non-formalized language is interpreted, but not conversely, or that a non-interpreted language is formalized, but not conversely, for instance the language of logic is formalized and interpreted, the diversity of symbols invented as an illustration for a pure formal language are formalized and non-interpreted, the ordinary language is interpreted and non-formalized. Both the introduced contrasts are not clear-cut, because there are cases of pure intermediary, e.g. the language of the usual mathematics is partially formalized. Hence, the term "formal language" is ambiguous, as it may apply to either a pure language or to a formalized one, and similarly ambiguous is the term "non-formal language," because it applies to the interpreted as well as to the non-formalized language. We can clearly see, now, why if a language **L** is formalized then its description in a meta-language **ML** is necessarily non-formalized to some extent. As an illustration may serve even the fact that logical formalizations are introduced by the language of intuitive mathematics, that is merely partially formalized.

Finally, in this paragraph I would like to touch upon two more detailed questions. The first one concerns the basic carrier of meaning, i.e. a linguistic unit being an atom of meaning. We are asking how the functor "means that" behaves, that is, what its argument (or arguments) is (or are). I assume after Kotarbiński (1929: 10) that it is exclusively after sentences that we can sensibly operate with the expression "means that," that is, the right scheme has the form "the sentence *A* means that," here; "means that" is a two-argument functor from the sentence arguments. Thus, it is the sentence, and not the word, that is the basic unit of meaning. Therein consists the so-called Frege's context principle saying that semantic functions of expressions other than sentences must be analyzed in a sentence context. A word does have meaning as a component of a sentence, and

does not by itself.[7] The context principle is in accordance with the order of logical systems, in which the sentential calculus is the basic theory, and the predicate calculus, which penetrates the internal structure of sentential expressions, is its expansion. But this principle conflicts with the traditional view in which the sentence was considered a combination of words. Independently of Frege, or even earlier, the traditional view had been questioned by Brentano, according to whom the sentence (or, rather, proposition) is a sui generis logical construct. That is the so-called idiogenic theory of judgment (Twardowski 1907), opposed to an allogenic theory, i.e. to the one considering judgment a combination of concepts.[8] The second question concerns the already mentioned compositionality. It is commonly agreed that logical (or, maybe, also grammatical) syntax is compositional, that is, a complex expression is syntactically a function (in the sense of mathematics) of the single ones. This manifests itself for instance in the recurrential definition of the sentence formula in the sentential calculus and the predicate calculus. As we can see below, a compositional one is the notion of satisfaction, which is a basis for formal semantics as logic as well as, intermediately, the semantic concept of truth. While it is highly controversial if the notion of meaning is compositional (cf. Janssen 1997, Cruse 2000 :65-81).

§3. SEMANTIC CONCEPTION OF TRUTH[9]

STT has two aspects, namely, a mathematical and a philosophical one. The first aspect consists in applying mathematical apparatus (multiplicity theory, arithmetics, and universal algebra) in defining truth, the second concerns the answer to the question, if whether a definition obtained in this way still belongs to the philosophical tradition. Tarski's standpoint was that his definition agrees with the classical one, or with a correspondence conception of truth. He connected this with the scheme

(**T**) the sentence $\ulcorner A \urcorner$ is true in the language **L** only if A^{ML},

[7]In practice, it occurs, of course, that having heard or read a single word is generally followed by its understanding. For this reason, it is fully permitted to speak of the meaning of words.

[8]It cannot be excluded that, in this respect, Kotarbiński was rather influenced by Brentano and Twardowski than by Frege.

[9]The semantic definition of truth has been formulated in: Tarski (1933); cf. also Tarski (1936), Tarski (1944), Tarski (1969). For a more detailed discussion on this idea, see Woleński (2005, ch. VII-IX). In this article, many questions, a.o. the question of antinomies, are omitted for brevity.

where the notation $\ulcorner A \urcorner$ is the name of the sentence A, and the notation A^{ML} marks, that the sentence named with the symbol $\ulcorner A \urcorner$ in a certain way is expressed in the meta-language. From this follows that (**T**) belongs to the meta-language **ML**. The inter-relationship between **L** and **ML** may be illustrated by the following example:

(1) *the sentence* "śnieg jest biały" *is true in Polish if and only if snow is white.*

Here, the Polish language is an object-language, the English language — a meta-language. By using quotation marks a name for the suitable Polish sentence in English is established, and expressing this sentence in the meta-language consists in translating it into the sentence "*snow is white*." The so-called convention **T** formulates the following condition of material adequacy: a definition of truth is materially correct if it logically implies all **T-**equivalences obtained from the **T**-scheme by placing a name of a particular sentence of a language **L** on the left hand side, and a meta-linguistic version of this sentence on the right hand side.

The **T**-schema is not a definition of truth. In order to get such a definition, let us now consider a formalized language **L.** We assume, without showing it in detail, that **L** is a first-order language without equality symbols and function symbols. Its alphabet consists of a list of variables, a list of individual constants (both the lists forming a set of terms), a list of predicate characters (predicates), and a list of logical constants (constants of the sentential calculus, quantifiers). We assume to have presented a recurrential, that is compositional, definition of the formula of a language **L**. Because, due to the general assumption that the definition of truth should apply to an interpreted language, we must characterize the interpretation of a language **L**, i.e. a map **I** transforms the expressions of **L** into particular objects. An interpretation **I** for a language **L** maps the expressions of this language into particular objects as their denotations (values). As a matter of fact, this is an interpretation of an alphabet. Our intuition dictates what follows: we define a set of objects, let us say, **U**. The individual variables are interpreted by the objects from **U**, the same with the individual constants, provided that the interpretation of constants is fixed and that of the variables not-fixed, one-place predicates — by the sub-sets of **U**, the many-place predicates — by the many-place relations defined on **U**, i.e. by appropriate Cartesian products of the type $\mathbf{U} \times \mathbf{U} \times \ldots \times \mathbf{U}$. The interpretation of logical conjunctions is provided by the sentential calculus, the general quantifier

operates on the whole **U**, the particular one on its non-empty subsets. The domain of interpretation is the sum of sets

$$\jmath = \{\mathbf{U} \cup \{u_1,\ u_2\ ,\ u_{3,\ ...}\} \cup \{P^{1,1}, P^{2,1}, \ldots, P^{1,2},\ P^{2,2}, \ldots, P^{1,i}, P^{2,i}, \ldots\}\ ,$$

where (a) $\mathbf{U} \neq \varnothing$, (b) $\forall i\ (u_i\ \in\ U)$, $i = 1, 2, 3, \ldots$; (c) $\forall j,\ k\ (P^{j,k} \subseteq \mathbf{U} \times \overbrace{\quad}^{k\ times} \times \mathbf{U}$; **U** is a universe of the domain, $u_1,\ u_2\ ,\ u_{3,\ ...}$are marked objects of the domain, while $P^{j,k}$ — a j-th, and k-argument attribute, i.e. it takes the j-th place on a list of k-argument attributes. It has to be pointed out that the nature of the alphabet of language constrains certain properties of the interpretation domain. If **L** contains a certain amount of individual constants, then only the same amount of objects of **U** (i.e., $u_1,\ u_2\ ,\ u_{3,\ ...}$) must be marked. Particular objects may remain unnamed, but all the constants must be interpreted, at least if the standard, classical logic has been assumed (this is an obligatory condition henceforth). A requirement like this also applies to predicates and relations. Intuitively, one-argument predicates correspond with properties as with their interpretation (I will not discuss, here, the controversial question of the nature of properties understood extensionally, i.e. as sets, and intensionally, i.e. as features), many-argument predicates — with appropriate relations; generally speaking, predicates denote one-argument or multi-argument attributes. There might exist properties and relations that are not named, but all the predicates must be interpreted.[10] Supposed we had a language **L** with an alphabet including three individual constants a, b and c, one one-argument predicate P, and one two-argument predicate Q. This alphabet (or, simply, language because of its signature depending exclusively upon the alphabet) has the signature $< 0\ ; 0; 1; 2 >$ (the constants being usually represented by 0, the predicates by a number corresponding with its argumentness, i.e. with the number of arguments). The signature informs us about our language as having two constants, one one-argument predicate, and one two-argument predicate, although we know nothing more about these constants and predicates. Nonetheless, we can conclude for the minimal domain required to interpret this language to have the signature $< 0^*;\ 1^*;\ 2^* >$ (asterisks are used to mark the signature of the domain, not the one of the alphabet), i.e., it includes at least one marked object, at least one subject interpreting P, and at least one relation interpreting Q; we say "at least" and not "exactly," because we think that certain objects in the structure may not be named, and

[10] If we assume that the map interpreting expressions is a bijection, then all the objects of the domain must possess an expression corresponding with it.

we do not exclude that two (or more) expressions may be interpreted in the same way. *Vice versa*, however, i. e. two interpretations for one expression, is excluded, because of the interpretation being a function, that is, assigning one and only one value to every expression. The way this is presented leads us from the interpretation of language to the domain of interpretation, but a reverse procedure can also be possible, i.e. from the domain assumed to the language to be interpreted by the domain. In such a case, the actual form of Idetermines a minimal alphabet interpretable by this domain.

The definition of interpretation looks like this (the symbol $\mathbf{I}\ (E,\ \jmath)$ means "interpretation of an expression E in the domain $\jmath$"; it would be also correct to say "valuation in the domain"):

(2)

(a) $\mathbf{I}\ (x_i,\ I) \in \mathbf{U}$;

(b) $\mathbf{I}\ (a_i,\ I) = u_i$;

(c) $\mathbf{I}\ (P^{j,k},\ I) = R^{k,j} \subseteq\ U^n$, where U^n $(n = 1, 2, 3, \dots)$ is a n-th Cartesian power of the set $\mathbf{U}$ ($U^0 = \varnothing$, $U^1 \subseteq \mathbf{U}$, $U^2\ \subseteq \mathbf{U} \times \mathbf{U}$, etc.).

According to what has been said (that the interpretation is a function) we may present it as a collection of mappings from the components of $\mathbf{A}L_L$ to the next succeeding words of $\jmath$, that is $\mathbf{I}\ (\mathbf{Z}I_L,\ I)$: $\mathbf{Z}I_L \rightarrow\ U_I$; $\mathbf{I}\ (\mathbf{S}T_L,\ I)$: $ST_L \rightarrow \{u_1,\ u_2\ ,\ u_{3,\ \dots}\}_I$; $\mathbf{I}\ (\mathbf{P}R_L,\ I)$: $\mathbf{P}R_L \rightarrow \{P^{1,1},\ P^{2,1},\ \dots,\ P^{1,2},\ P^{2,2},\ \dots,\ P^{1,i},\ P^{2,i},\ \dots\}_I$. This can be generalized in some way. We may define the part of Istanding after $\mathbf{U}$, i.e. the words $u_1,\ u_2\ ,\ u_{3,\ \dots}, P^{1,1},\ P^{2,1},\ \dots,\ P^{1,2},\ P^{2,2},\ \dots,\ P^{1,i},\ P^{2,i},\ \dots$, as a characteristic of the interpretation structure, let us mark this with $\mathbf{C}$. In this way, the structure of $\jmath$ is reduced to an ordered pair $< U.\ C >$. Due to the definition of such a pair, this is the set $\{\{\mathbf{U}\}, \mathbf{U}, \mathbf{C}\}$. This enables us to define the interpretation of the alphabet of $\mathbf{L}$ by the mapping of $\mathbf{I}\ (\mathbf{A}L_L, \jmath)$: $\mathbf{A}L_L \rightarrow \{\{\mathbf{U}\}, \{\mathbf{U}, \mathbf{C}\}\}$. The condition (2c) makes it clear why the predicates have parameters: because they can be evaluated by any relationships, provided that they preserve their argumentness. Nevertheless, the interpretation of the predicates is taken for being fixed until it is changed. We may express this when speaking of an arbitrary but fixed interpretation. This means that we can change the interpretation without changing the domain itself. Essentially, parameters are something "between" constants and variables. (2b) determines the denotations of the individual constants to be fully stable at a given interpretation $\mathbf{I}$, that is, a new assignment of denotation means another domain $\jmath$. A clear distinction should be made between interpreta-

tions and interpretation domains. The former are mappings while the latter are sets (sums of sets). The distinction is made between categories, to say it in slightly ontological jargon. Functions are formal equivalents of actions. Interpretation domains may be regarded as effects of the interpretation, as actions or objects assigned to the elements of an alphabet by the interpreter. This corresponds, to some extent, with the notoric ambiguity of the term "interpretation" denoting the action of interpretation as well as the effect of interpretation. To use a somewhat convenient terminology of hermeneutics, language is the interpretandum, interpretation domain — the interpretans, and interpretation itself — the correlation between them.

The definition of interpretation under consideration does not include expressions from the sentence category, that is, open formulas and sentences. The first ones *de facto* are interpreted by predicates; an important problem concerns the others because, from a logical point of view, language is a set of sentences, and we have also considered the sentence as the smallest unit of meaning. We want the sentences to be interpreted by truth or falsehood. Crucial to the definition of truth is the concept of satisfaction. Formulas are (or are not) satisfied by one-argument items — by single objects, e.g., "x is a city" by Cracow, by two-argument items — by pairs of objects, e.g., "x is located on the west of y" by the pair $< Cracow,\ Rzeszów >$, in even this, not in reverse order. Generally speaking, if a formula $\ulcorner A \urcorner$ containing n free variables is satisfied, then it is satisfied by the sequence $< u_1,\ \ldots,\ u_n >$. In order to avoid defining the concept of satisfaction for every single case of argumentness, Tarski proposed to use infinite sequences of items as a definition. This is sufficient, because the formulas of a language **L** are formulas of finite length, so a non-finite sequence (or a finite one consisting of a sufficient number of elements) always consists of a number of elements we need, irrespective of the length of the given formula. We therefore define the context "sequence $\mathbf{s} = < s_1,\ s_2,\ s_3,\ \ldots >$, where $s_i = u_i$, for any i, satisfies the formula $\ulcorner A \urcorner$ on interpretation **I**" (the words of this sequence are variables' values, due to the principle, that u_i is a value of the variable x_i). The fact that sequence $\mathbf{s} = < s_1,\ s_2,\ s_3,\ \ldots >$ satisfies the formula A on interpretation **I** is written as $\ulcorner A \urcorner \in$ **SAT** (**s**, **I**). The definition is as follows (the notation $P\ (t_1,\ ..., t_k)$ expresses that the predicate P has k arguments, predicate numbering is omitted; we assume that the domain $\jmath$ and the language have been chosen; we assume further the one-word sequence $< u >$ being identical with **u;** "iff" is shortened "if and only if"):

(3)

(a) $\ulcorner P(t_1, ..., t_k)\urcorner \in$ **SAT**(**s**, **I**) iff $\langle I(\ulcorner t_{j,l}\urcorner), ..., I(\ulcorner t_{j,k}\urcorner)\rangle \in R^{j,k} (= I(\ulcorner P^{j,k}\urcorner))$

(b) $\ulcorner \neg A\urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A\urcorner \notin$ **SAT** (**s**, **I**);

(c) $\ulcorner A \wedge B\urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A\urcorner \in$ **SAT** (**s**, **I**), and $\ulcorner B\urcorner \in$ **SAT** (**s**, **I**);

(d) $\ulcorner A \vee B\urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A\urcorner \in$ **SAT** (**s**, **I**), or $\ulcorner B\urcorner \in$ **SAT** (**s**, **I**);

(e) $\lceil A \Rightarrow B\rceil \in$ **SAT** (**s**, **I**) iff $\ulcorner \neg A\urcorner \in$ **SAT** (**s**, **I**), or $\ulcorner B\urcorner \in$ **SAT** (**s**, **I**);

(f) $\ulcorner A \Leftrightarrow B\urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A \Rightarrow B\urcorner \in$ **SAT** (**s**, **I**), and $\ulcorner B \Rightarrow A\urcorner \in$ **SAT** (**s**, **I**);

(g) $\ulcorner \forall x_i A\ (x_i)\urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A(x_i)\urcorner \in$ **SAT** (s', **I**), for every sequence s' distincting from the sequence **s** at most at the place i.

(h) $\ulcorner \exists x_i A\ (x_i)\urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A(x_i)\urcorner \in$ **SAT** (s', **I**), for a particular sequence s' distincting from the sequence **s** at most at the place i.

The basic points are (3a), (3g), and (3h) for the remaining ones that re-construe the sense of logical constants of the sentential calculus. The condition for atomic formulas, i.e. (3a), precisely defines the nature of an expression of the formula named by $\ulcorner P(t_l, \ldots, t_k)\urcorner$ *in* the meta-language, or, more precisely, in the language of multiplicity theory. The condition (3g) states that the formula preceded by a general quantifier is satisfied if the formula under the quantifier, i.e. $A(x_i)$, is satisfied by every sequence of items, while the condition (3h) states that the formula preceded by an existential quantifier is satisfied, if there exists at least one sequence that satisfies it. If **s** and s' are sequences interpreting variables such that $s_i = s'_i$ for every free variable x_i, then $\ulcorner A\urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A\urcorner \in$ **SAT** (**s**, **I**) (the symbol s_i denotes an i-th word in the sequence **s**). This means that the interpretation sequences only are as important as their words agree with the free variables of formula A. If these variables are i in number, then their interpretation does not depend upon the words marked with a higher number than i. An important aspect of the satisfaction definition is its inductive nature that is parallel to the formula definition. Thanks to this, the notion of satisfaction is compositional in the same sense as the syntax of a language **L** is.

If a formula A is a sentence, this means that it has no free variables. Thus, two sequences interpreting the variables agree with each other at the places appropriate for free variables, because such places simply do not exist. If then one sequence satisfies the sentence, then so does every other sequence. Supposed that the variables $x_1, \ldots, x_k$ were all the free variables in the formula A, and that the sequence $\mathbf{s} = < u_1, u_2, u_3, \ldots, u_k, \ldots >$ satisfied this formula. Suppose further that step by step we get rid of free variables by quantification, or by substituting the individual

constants. This would result in the elimination of appropriate words of the sequence as relevant for the satisfaction of formula A. If we eliminate all the free variables, the empty sequence $<>$ agrees with the sequence **s** at all the places appropriate for free variables in formula A. We may express it as

(4) If A is a sentence,
(a) $\forall$**s** ($\ulcorner A \urcorner \in$ **SAT** (**s**, **I**) iff $\exists$**s** ($\ulcorner A \urcorner \in$ **SAT** (**s**, **I**) iff $\ulcorner A \urcorner \in$ **SAT** ($<>$, **I**);
(b) $\neg\forall$**s** ($\ulcorner A \urcorner \in$ **SAT** (**s**, **I**) iff $\exists$**s** ($\ulcorner A \urcorner \notin$ **SAT** (**s**, **I**) iff $\ulcorner A \urcorner \notin$ **SAT** ($<>$, **I**).

Remember that formula $\neg\forall$ is satisfied if A is not satisfied. If a sentence A is not satisfied by one sequence, then it is not satisfied by any sequence, and it also is not satisfied by an empty sequence. Then, the negation of a sentence is satisfied. Thus, if A is a sentence, then it is satisfied by any sequence (one sequence, empty sequence), or it is satisfied by no sequence. We identify the first alternative with truth (**VER**), the other alternative with falsehood (**FLS**). This leads us to the following definition of truth (it is convenient to use here the relativisation to interpretation, which automatically applies to language, because every **I** refers to the alphabet of a language):

(**DP**) (a) $\ulcorner A \urcorner \in$ **VER** (**I**) iff $\forall$**s** ($\ulcorner A \urcorner$) $\in$ **SAT** (**s**, **I**);
(b) $\ulcorner A \urcorner \in$ **FLS** (**I**) iff $\exists$**s** ($\ulcorner A \urcorner \notin$ **SAT** (**s**, **I**).

Variants of (**DP**) are obtained by making an appropriate application of equipollences (4a) and (4b).

Satisfaction of formulas by sequences of objects needs some comments and explications. Sequences are functions from natural numbers to any non-empty set. Formally, a sequence **s**: **N** $\rightarrow$ **X**, where **X** is a set. If **X** is a finite set, then **s** is a finite sequence; otherwise we have to make do with a non-finite sequence. From this follows that sequences consist of ordered pairs $s_1 = < 1,\ x_1 >$, $s_2 = < 2,\ x_2 >$, etc. As a result, open formulas and closed formulas (sentences) are satisfied not by collections of individual objects, as we may say intuitively (this in particular may be seen in reference to one-argument formulas of the type Px, e.g., we suppose the condition "x is the capital city of Poland" to be satisfied by the city Warsaw, and not by the pair $< 1,\ Warsaw >$), but by pairs, each of them consisting of a natural number and an item from the set **X** assigned to this number by **s**. But we can fix this inconvenience in a very simple way. If **s**: **N** $\rightarrow$ **X**, then **N** is a domain and **X** a counter-domain. We construct an image **s** (**N**) of

the set **N** under the function **s**. In this way, we get a set of all the elements of **X** that are the values of the function **s**. Formally speaking: $\boldsymbol{x} \in$ **s** (**N**) iff $\exists \boldsymbol{n}$ ($\boldsymbol{n} \in$ **N** $\exists$ **x** = **s** ($\boldsymbol{n}$)). The use of this construction to (3) and (**DP**) is based on the following idea. We take a set of individual variables. We define the mapping **e**: **N** $\rightarrow$ **ZI** and an image of **N** by **e**. In this way, we get the variable ordering by indices: $x_1,\ x_2, x_3, \ldots$ The next step consists of mapping indices representing variables into the set **U** (the universe of interpretation), noted as **s**: **ZI** $\rightarrow$ **U**; essentially, this is a function from N to U. Next, we define an image **s** (**ZI**), and we get an ordered set of items corresponding with the variables. Finally, we say of the formulas to be satisfied (or not satisfied) by the images of the set **ZI** under the sequences as functions. Since the images correlate variables with objects, we can say that the formulas are satisfied by ordered combinations of semantic images of variables.

A semantic definition of truth can be expressed in a somewhat different way. Let us consider a structure like **M** = <**UC**>, where **U** is a particular set of objects and **C** consists of a list of objects selected from **U**, and a list of relations marked on **U**. Let **X** be a set of sentences of a language **L**. If for every $A \in$ **X**, A is true in **M**, we say, that **M** is a model of a set **X** of sentences, and write this $A \in$ **VER** (**M**). We can start from the set **X** and seek a model **M** for it, or we can go in the opposite direction, i.e. seek a theory to describe model **M**, i.e. the set $A \in$ **VER** (**M**) (the set of sentences true in this model). In both cases, the interpretation arises. In the first case, the interpretation is assumed if seeking a model, in the other case, we are interested in the way of interpreting expressions for a certain corpus of sentences to describe a given structure. Any arbitrary set of sentences of an interpreted language possesses an interpretation independently of whether the sentences are true or false. However, we speak of models exclusively with respect to true sentences. Because (**DP**) is still the same, we speak of model-theoretic definition of truth and of the model-theoretic semantics. However, it should be noted that language as a whole has no model, because it includes false sentences (it certainly does, since its alphabet includes a negative conjunction).[11] Since no particular set of sentences has a model, and every set of true sentences is non-contradictory, then we can intuitively assume that set **X** of sentences is non-contradictory only if it has a model. This provides a method of proving non-contradictory (we sometimes speak

[11]This is the main reason why model and interpretation are distinguished. I have to add that this is why the domain has been defined as a sum of sets, and not as a structure in the sense of universal algebra. The model is such a structure.

of proving by interpretation), though this procedure is less powerful, and constructing a model of a given theory usually requires stronger means than those generated by the theory itself.

As I have already pointed out above, the notion of satisfaction is compositional. And how is the notion of truth? The question would be simple if the definition of truth was a recursive definition, but in fact it is not. The reason is simple. Let us consider a formula (#) $\exists x Px$. It consists of an expression $\exists x$ and an expression Px, A recursive definition of truth of (#) had to make its truth dependent on the truth of the sub-formula Px. But the latter includes a free variable, and so it cannot be assumed to be either true or false. This can be changed, if we assume that each object from **U** has its name, and sometimes this assumption is even used. In such a case, a recursive definition of truth is possible, although it looks somewhat unnatural if we assume that every object has an appropriate, constant individual term. However, if a set of true sentences is given, then the predicate "is true" is fully compositional. It relates to the fact that (**DP**) defines the set of true sentences in a given model.[12]

§4. INTERPRETATIONS AND MEANINGS

If truth is defined for interpreted languages, the question is: where do interpretations come from? Let us consider language **L** including four individual constants, "Socrates," "Plato," "Aristocles," and "Aristotle," as well as two predicates "is a philosopher" and "is a teacher." Supposed we knew nothing about the denotations of constants and predicates, although we know the signature of **L**. This is sufficient to seek for interpretations that are right in the domains with the signatures $< 0^*,\ 0^*,\ 0^*,\ 0^*;\ 1^*;\ 2^* >$, $< 0^*,\ 0^*;\ 1^*;\ 2^* >$. and $< 0^*;\ 0^*,\ 1^*;\ 2^* >$. But, if our interpretation are to be historically correct, we should take the domain with the signature $< 0^*,\ 0^*;\ 1^*;\ 2^* >$, because the constants "Aristocles" and "Plato" refer to the same person. Further, if we take a domain without a two-argument relation, then the sentences "Socrates was Plato's teacher" and "Plato was Aristotle's teacher" could not be interpreted. The fact that we can get some data concerning the nature of interpretation from the characteristics of the formalized language, is an interesting thing. It conflicts with a rather

[12]This is sometimes a reason for the objection, that semantics is asemantic, since it does not characterize the meaning of the predicate "is true", but the extension. It is a misunderstanding, because with every non-empty extension an intarsion is connected (in the case of empty predicates, this is more complicated, but I will not speak of this); for a more detailed discussion on this matter, see Woleński (2005: 327-329).

common belief, that formalized languages are completely empty as to the content. While a language signature provides only vague information about the interpretation domain, this is still not meaningless. In particular, a certain structural similarity of **L** and $I$is discovered in this way. If working within a particular interpretation, e.g. such as a historically correct one, I must respect that the predicate P denotes a set of philosophers, if this has been decided so. But nothing will change in the domain if I go to a new interpretation, that is, if I assume that this predicate denotes a set of athletes. But if I decide that Socrates is a value of the term "Socrates," and then, that the value of this term is Aristotle, the interpretation domain will change, though the set of philosophers continues to be the same.[13] The condition (3a) refers to the interpretation of the constant as being not stable, because it consists in assigning any element from the universe **U** to it. The new assignment has influence neither on the interpretation of individual constants nor on the interpretation of predicates.

We may also use here modal logic. Due to the semantics of modal logic, the sentence "it is possible that A" (symbolically, $\Diamond A$) is true in a marked world M^* (let it be the real world) only if there exists such an alternatively (I am leaving aside, here, the definition of alternativeness) possible world model M', that A is true in M'. The real world is certainly one of the possible worlds, and every real world is a model. If A refers to an accidental event, then true (in a real world) is $\Diamond A$, as well as $\Diamond\neg A$. From this follows, that A is true in an alternative model M', and $\Diamond\neg A$ in a model M'', both the models being different from each other. Let A be a sentence, e.g. let A be the sentence

(5) Plato was Socrates' student.

Because it is true in a real world, then in the same world true (we assume alternativeness being a reflexive relation: every world is an alternative for itself) is the sentence

(6) It is possible that Plato was Socrates' student.

But, if we consider (6) to refer to an accidental event, then (in a real world) true is the sentence

[13]Contemporary football fans perhaps remember that Socrates is a nickname under which we knew the Brazil football captain in the World Cup in Brazil 1986 [translator's note: The 1986 World Cup was held in Mexico — Socrates played for Brazil but not as captain].

(7) It is possible that Plato was not Socrates' student.

From this follows that the sentence

(8) Plato was not Socrates' pupil.

is true in a possible model, because we can imagine that there exists such a world in which Plato was not Socrates' student. Let us now consider the predicate "to be Socrates' student." Its content is in (5) (at least from an ordinary point of view) the same one as in (8). The semantic interpretation, however, is in both cases another one. Our predicate denotes a set of people, in one case such that Plato belongs to, and in the second case such that Plato does not belong to. They are then two different sets. Well, we have then an ordinary sense of the predicate "to be Socrates' student," and its two different extensions (it is, obviously, not a vague predicate).

Theoretically, as regarding the well-known relationship between content and extension of names and concepts, a distinction in extension should manifest itself as a distinction in content. But, it is not always necessary to mark it in a special way. In the ordinary language, not in the scientific one, it sometimes becomes indispensable. Generally, the meaning of expressions works as in the case under consideration, it is something external to interpretation, or extension as well as the sense correlating with it – something internal. We assume, then, that the way of understanding individual constants in language **L,** falling under the semantic interpretation in a model-theoretical sense, is dictated to by the expressions' meaning. This is what constitutes the formal sense (intension) of a given expression and, finally, its extension. And it makes no difference how meaning is defined: as an idea in the mind, a way of behaviour, an abstract object, directly as denotation, or as a use, because the result will always be the same, namely, a decision about the value of expression in a model. I do not want to say that the concept of meaning is philosophically futile and not worth exploring in the philosophy of language. In my view, it is just the opposite. I am also convinced that reducing meanings to extensions should not be possible. An argument for this matter will be given in the next paragraph.

Can the meaning we are talking about be arbitrary? Theoretically yes, but certainly not if language has to be a way of communication. We must then add that the expressions' meaning should make it possible to utter true or false sentences, not for any model but for the one approximating the

way things are in the real world. However, this requirement looks to be a vicious circle, or something similar. But I need to point out (I am not saying that this is the only one solution) that a naturalistic conception of language according to which language is an instrument for the correct or incorrect description of the world, owing to the fact that it functions within the frame of human cognitive practices, as well as to its relations to the world, repeals the appearance of a vicious circle. I do not know what Tarski thought of this subject, but his remark that everything can finally be translated into the ordinary language even suggests such a view. It is then really so that the semiotic markedness of the ordinary language, and its translation universality (see the quotations from Tarski at the beginning of this article), play an extraordinary role. Even such a character of ordinary speech may be explicated in different ways. It seems to me that the right way is to combine in a certain way Husserl's concept of the so called *Lebenswelt* (world of ordinary experience), and Ryle's ideas on ordinary language (Woleński 2007), although phenomenology is commonly pointed to as opposite to naturalism.

Husserl (1936: 50-51) introduced this concept in the following way:

> This actually intuited, actually experienced and experienceable world, in which practically our whole life takes place, remains unchanged as what it is, in its own essential structure and its own concrete causal style, whatever we may do with or without techniques. Thus it is also not changed by the fact that we invent a particular technique, the geometrical and Galilean technique which is called physics.

Not mentioning controversies concerning interpretation (in particular those on transcendentalism), we may say what follows is that people live in an already-existing reality they do not question in their everyday life. This reality, or *Lebenswelt* contains, (except human beings, animals, animated things, and human products) the mixture of nature and culture in the traditional sense of these notions. *Lebenswelt* is an object of human thoughts and activities directed towards it as to an intentional object. Human attitude towards *Lebenswelt* is natural, naive, and pre-theoretic. In history, there was the mathematized science that went beyond this attitude (Husserl connects this with *Galileo's inventions*), and led, as a matter of fact, to objectivism, but it did not invalidate the everyday experience. Everyday experience all the time sets the horizon of every kind of experience, of ordinary, practical as well as of the scientific experiences being in this sense *a priori*. *Lebenswelt* determines therefore the epistemological horizon that is certainly changing due to the accumulated experience. This horizon is treated as a natural fact,

and not as any transcendental occasions.

According to Husserl, language is a component, or even an invariant, of *Lebenswelt*. At this point, it seems useful to refer to some ideas of Ryle, concerning the meaning of the adjective "ordinary" in respect to the language (Ryle 1953: 166-167, 167-168, 173-174). The crucial distinctions made by Ryle are these:

[...] I want to begin by contrasting the phrase "the use of ordinary language" with the similar-seeming but totally different phrase "the ordinary use of the expression "..."." When people speak of the use of ordinary language, the word "ordinary" is in implicit or explicit contrast with "out-of-the-way," "esoteric," "technical," "poetical," "notational," or, sometimes, "archaic." "Ordinary" means "common," "current," "colloquial," "vernacular," "natural," "prosaic," "non-notational," "on the tongue of Everyman," and is usually in contrast with dictions which only a few people know how to use, such as the technical terms or artificial symbolisms of lawyers, theologians, economists, philosophers, cartographers, mathematicians, symbolic logicians and players of Royal Tennis. There is no sharp boundary between "common" and "uncommon," "technical" and "untechnical" or "old fashioned" and "current." Is "carburettor" a word in common use or only in rather uncommon use? Is "purl" on the lips of Everyman, or on the lips only of Everyman? What of "manslaughter," "inflation," "quotient" and "off-side?" On the other hand, no one would hesitate on which side of this no-man's-land to locate "isotope" or "bread," "material implication" or "if," "transfinite cardinal" or "eleven," "ween" or "suppose." The edges of "ordinary" are blurred but usually we are in no doubt whether a diction does or does not belong in ordinary parlance. [...]

But in the other phrase, "the ordinary use of the expression "...","" "ordinary" is not in contrast with "esoteric," "archaic" or "specialist," etc. It is in contrast with the "non-stock" or "non-standard." We can contrast the stock or standard use of a fish-knife or sphygmomanometer with some non-regulation use of it. The stock use of a fish-knife is to cut up fish with; but it might be used for cutting seed potatoes or as a heliograph. A sphygmomanometer might, for all I know, be used for checking tyre pressures; but this is not its standard use. Whether an implement or instrument is a common or a specialist one, there remains the distinction between its stock use and non-stock uses of it. If a term is a highly technical term, most people will not know its stock use or *a fortiori*, any non-stock uses of it either; if it has any. [...] When we speak of the ordinary or stock use of a word we need not be characterising it in any further way, e.g., applauding or recommending it or giving it any testimonial. We need not be appealing to or basing anything on its stock-ness. The words "ordinary," "standard," and "stock" can serve merely as a reference to a use without describing it. They are philosophically colourless and can be easily dispensed with. [...]. [...] learning or teaching the ordinary or stock

use of an expression need not be, though it may be, learning or teaching the use of an ordinary or vernacular expression [...]. [...] Lots of philosophers, whose dominant good resolution is to discern logico-linguistic differences, talk without qualms as if "use" and "usage" were synonyms. [...] A usage is a custom, practice, fashion or vogue. It can be local or widespread, obsolete or current or current, rural or urban, vulgar or academic. There cannot be a misusage any more than there can be a miscustom or a misvogue. The method of discovering linguistic usages are the methods of philologists. [...]

By contrast, the way of operating a razor blade, a word, a traveller's cheque or a canoe-paddle is a technique, knack or method. Learning it is learning how to do the thing; it is not finding out sociological generalities, not even sociological generalities about other people who do similar or different things with razor blades, words, travellers' cheques or canoe-paddles.[...] Descriptions of usages presuppose descriptions of uses, i.e., ways or techniques of doing the thing, the more or less widely prevailing practice of doing which constitutes the usage. [...] Techniques are not vogues — but they may have vogues. Some of them must have vogues or be current in some other way. For it is no accident that ways of employing words [...] *tend* to be identical through a whole community and over a long stretch of time. We want to understand and be understood; and we learn our native tongue from our elders. Even without the pressure of legislation and dictionaries, our vocabularies tend to lean towards uniformity. Fads and idiosyncrasies in these matters impair communication.

The fundamental points recommended in this extensive quotation are the following five. In the first place, a typical (standard) expressions' use (nothing will change if we replace "use" by "meaning") belongs to commonly used expressions, as well as to specific ones. As acceptable appears, then, the term "ordinary (standard) use of a not ordinary (specific) expression." Secondly, use is more basic than usage, even though they are connected with each other. Thirdly, usage is the subject of sociological description, whereas use may be that or may not. Fourthly, learning to use a language does not need to appeal to rules, although the first does not preclude the other. Fifthly, in order to communicate, using expressions must tend to uniformity.

In my opinion, we have almost everything we need to develop a satisfactory philosophical theory of the universality of ordinary language. In particular, as basic appears the use of expressions of the ordinary (natural) language, in their ordinary (typical, correct) use (meaning). I have written, however, that we have "almost everything," because Ryle lacks an explication of causation, why it is so that the ordinary use of natural language expressions plays a central and marked role. And, here, the notion

of *Lebenswelt* may turn out to be profitable for us. This term is an arena on which the ordinary use of linguistic expressions as well as the repertoire of natural language expressions appear. Keeping in mind what an ordinary use of natural language expressions is, we may propose the understanding of *Lebenswelt* as a world, in which a typical (correct) use of all linguistic expressions, both the commonly used and the specific ones, comes into being. Generally speaking, *Lebenswelt* is the world of the everyday experience, that is principally correct, and one on which any other experience constitutes itself, considered as correct or incorrect. *Lebenswelt per se* does not guarantee the truth of statements made by it, but it is, as we can say, responsible for expressions' ordinary use, thanks to which the expressions can occur at all. Briefly: the fact that we are living in a world of ordinary experience determines that the language existing here generates a natural, standard or intended interpretation of expressions. Thanks to this interpretation, sentence (5) is true, and the sentence (8) — false.

We may now return to the discussion between Kokoszyńska and Tarski in 1936 (see §1). Kokoszyńska was right, at least in concerning the relativization to sounds and forms as being not sufficient, and in need of relating to meaning. But Tarski's answer, as enigmatic as it is, can be advocated too, with regard to the fact that he thought of an interpreted language. Although the interpretation of a formalized (or formal) language is theoretically arbitrary, and may always be changed, so the way of how the function **I** works is always based on how we understand individual constants and predicates (not to mention logical constants, whose sense is determined "in advance" in respect to certain individual interpretations). The presentation of expressions of the language **L** is connected with that, for which the definition of truth is built up in the meta-language **ML**, in which (**DP**) is expressed**.** Kokoszyńska used the notion of translation, and since translation appeals to meaning, it looked like relativization to sounds was not sufficient. Tarski also took translation into account, but his reluctance to meaning suggested another solution for him (Tarski 1944: 350), namely the one that **L** should be a part of **ML**. If we only remember that meanings are something outside the formal semantics, this controversy becomes a secondary one. We must only assume (see Nowaczyk 2000) that: (a) every sentence of a language **L** means something; (b) every sentence of a language **L** has one and only one meaning; (c) meaning subsists in mappings of the sentences from **L** on **ML** (e.g., the meta-linguistic sentence $u \in P$ preserves the meaning of a sentence *P (t)* (t is P) from the language **L** if the object u is a value of the term t). While assuming this, it is not important if we

translate sentences from **L** to **ML**, or if we are handling the former as a part of the latter. Regardless of this, it immediately may be seen that **ML** is less formalized than **L**. Obviously, we may submit **ML** to be formalized, but we must, then, use a non-formal **MML**.

But, why not introduce the concept of meaning directly into the definition of truth (as Künne 2003: 333-350 does)? I will justify a negative answer for simplicity using not (**DP**) but the **T-**schema. Let us modify (**T**) to the form

(9) the sentence $\ulcorner A \urcorner$ is true iff $\ulcorner A \urcorner$ means z and A.

A concrete illustration is

(10) the sentence "snow is white" is true iff the sentence "snow is white" means that snow is white, and snow is white.

By contraposition we obtain

(11) the sentence "snow is white" is false iff the sentence "snow is not white" does not mean that snow is white, and snow is not white.

Supposed that the sentence "snow is white" means that grass is green. In this case it is true that the sentence "snow is white" does not mean that snow is white. In this situation, the right hand side is true, and, as a consequence, the left hand side is true too, even if grass is green. The conclusion is that (9) does not form a good theory of falsehood, and every definition (or explication) of truth should provide a satisfactory explication of falsehood. One more subtle version of (1) (see Prior 1971: 104, Künne 2003: 347) consists in the assumption that

(12) the sentence $\ulcorner A \urcorner$ is true iff there is such a Z that $\ulcorner A \urcorner$ means Z and A.

However, it does not help, since the definition of falsehood takes the following form:

(13) the sentence $\ulcorner A \urcorner$ is false iff for each Z $\ulcorner A \urcorner$ does not mean Z, or non-A.

Here, again, we do not automatically get any definition of falsehood. Such a definition may be introduced (see Hugly, Sayward 1996: 356) by the formula

(14) the sentence $\ulcorner A \urcorner$ is false iff there is such a Z that $\ulcorner A \urcorner$ means Z, and non-A.

But, then, the sentence "A is false" is not a negation of "A is true." Although various comments made by proponents of the "conjunctive" approach (i.e., the one introducing the concept of meaning directly into the truth definition) suggest that it is simpler than (**DP**), so this is doubtful, since we should introduce special solutions for the falsehood.

Here we have another argumentation (Woleński 2001: 182-183). Let us assume we have a language consisting only of two sentences A and B. We introduce the following definition:

(15) the sentence $\ulcorner X \urcorner$ is true iff $\ulcorner X \urcorner$ means A, and A, or $\ulcorner X \urcorner$, means B and B.

Let us assume that $X = A$. So we obtain

(16) the sentence $\ulcorner A \urcorner$ is true iff $\ulcorner A \urcorner$ means A, and A, or $\ulcorner A \urcorner$, means B, and B.

Now, let us consider the right-hand side of (13), that is

(17) $\ulcorner A \urcorner$means A, and A, or $\ulcorner A \urcorner$, means B and B.

Though (17) is true, it is still logically not equipollent with sentence A. Therefore, we cannot deduct the **T**-equipollence for A from (15). If we assume, then, that the convention (**T**) is essential as an adequacy condition for the theory of truth, then the definition is materially not adequate.

However, the role of meaning in **STT** may be explicated by the assumption, that possessing meaning by the sentences of a language **L** is a presupposition of the whole semantic construction, not a clear element of (**DP**). Then, the argumentation contained in (12) — (14) cannot be carried out. We assume from the beginning that sentences A and B have a definite meaning. The definition of truth looks then (or may look) as follows (if we assume that **L** has an infinite number of sentences: without this condition, we must confine ourselves with a modified **T**-scheme):

(18) the sentence $\ulcorner X \urcorner$ is true iff $X = A$, and A, or $X = B$, and B.

If we assume that $X = A$, then the right-hand side takes the form

(19) $A = A$ and A, or $X = B$, and B.

The expression "$A = A$ and A" is equipollent with A (since its first element is a tautology, and a conjunction of tautology and any sentence Z is equipollent with this sentence). On the other hand, the expression "$A = B$ and B" is false, because it is not true that A and B are identical. From this follows, that the alternation "A or $(A = B)$ and B" is logically equipollent with the sentence A. An alternation consisting of a false sentence and any sentence Z is equipollent with the latter. In this way, we obtain a **T**-equipollence that we need for the sentence A (in the same way, for the sentence B). There arises, then, a certain disagreement between placing meaning within the **T**-scheme, or the definition of truth, and the presupposition that sentences mean something. This is also a formal exposition of the difference between external and internal handling of meaning in the constructions of formal semantics.

The connection between truth and meaning within **STT** has recently became a subject of special attention paid to the well-known attempt to define sentence meaning by its truth conditions, which was proposed by Davidson (see Davidson 1967, Davidson 1969, Davidson 1970, Davidson 1973; presented e.g. in Nowakowski 1997, Lepore, Ludwig 2005, Lepore, Ludwig 2007). It is called truth-theoretic semantics for sentences, and its use is widespread in contemporary formal semantics, in particular for the natural language. Davidson aimed to develop a fully extensional and compositional sentence semantics, that is one that would fulfill the extensionality principle (expression meanings are invariant to their substitution by extensionally equipollent sentences), and the compositionality principle, however, in a slightly different sense than it was presented at the end of §2, namely, that understanding a complex expression depends on how its components are understood. According to Davidson, **T**-equipollences, i.e. the sentences falling under the **T**-scheme, that is, the structure "$\ulcorner A \urcorner$ is true iff A," are basic for the theory of meaning. In particular, the right-hand side of any equipollence of this type formulates an appropriate truth condition for the sentence standing to its left-hand side. The totality of **T**-equipollences is the axiomatic basis for a given language. Davidson thought of natural language semantics, so he could assume the axiomatics to be finite, since the speakers of this language always make use of a finite number of sentences. Davidson's conception regards truth as a primary notion, and meaning as a secondary.

Davidson claims that the concept of truth, as it was explicated by Tarski, is clearer than the concept of meaning, and he proposes to read the expression "is true if and only if" as "means that." In this way, the **T**-scheme can be replaced by

(20) $\ulcorner A \urcorner$means that A,

and we can capture the exact meaning of the latter without resorting to the manoeuvre with the language and with translating its sentences into the meta-language, e.g. if using two different ethnic languages. In any case, the sentence "snow is white" means that snow is white.[14]

Davidson's project completely changes the relation between truth and meaning within **STT**, at least in the light of the analysis presented in the previous paragraph and, as it may seem, in accordance with what Tarski himself intended. There is obviously nothing wrong with this difference if we consider it *per se*, the more if the concept of truth is extensional and compositional. In particular, if any particular realization of the **T**-scheme, for instance

(21) the sentence "snow is white" is true iff snow is white,

is true, it remains true if we replace the right-hand side by another true event. Nevertheless, Davidson's conception encounters at least two difficulties (I continue, here, to use the argumentation presented in Woleński 1997, though the necessary material was added to it). Firstly, it is not known on what grounds we have to accept sentences of the type (20), without having previously interpreted the language. Particularly, the **T**-equipollence

(22) the sentence "snow is white" is true iff grass is green

which was built by replacing a true sentence "snow is white" with a true sentence "grass is green", certainly cannot be replaced with

(23) the sentence "snow is white" means that grass is green.

Davidson realized this question, and he tried to solve it by a beviourally defined linguistic competence of the speakers of a language but his attempt was a failure**.** Besides, this manifests itself in the fact that he

[14]However, at present we use translations.

later changed his views on it. In principle, I am leaving aside this aspect of Davidson's views, and I point to the presentations of Nowakowski or Lepore and Ludwig as mentioned above. Some remarks on this subject will be found at the end of the present paragraph.

Secondly, what perhaps happens to be more important, the expressions "is true if and only if" and "means that" have logically distinct senses. The equipollence "A is true if and only if A" commutes with negation, in the sense that the sentence

(24) it is false that $\ulcorner A \urcorner$ is true iff A

is equipollent with

(25) $\ulcorner A \urcorner$is false iff non-A,

while the sentence

(26) it is false that $\ulcorner A \urcorner$ means A

certainly is not equivalent with

(27) $\ulcorner A \urcorner$does not mean A.

In other words, there is a difference between "it is not true that means that A," and "means that non-A," that by no means can be expressed by the combination of "is true," and "it is not true that." The truth predicate in **STT** is extensional, and the predicate "means that" is not. Both may be treated as modalities satisfying an opposition from the logical square for modal sentences. Nevertheless, "means that A," and "means that non-A," are contraries, while "it is true that A," and "it is true that non-A ($\Longleftrightarrow$ it is not true that A)," are contradictories, at least within **STT**. A manoeuvre, analogic to the one with "is true if and only if," cannot be made for falsehood because it is not clear if a sentence like

(28) $\ulcorner A \urcorner$is false iff non-A

has to be read as (26), (27), or still in another way. If the above argumentation is sound, then an extensional analysis of meaning by means of truth conditions does not abolish the intensionality of this notion.

Also taken into consideration will be (see Kempson 1997: 27; to add that the author does not share this idea, but for other reasons than mine) the strengthening of the conception of Davidson with the assumption

(29) $\ulcorner A \urcorner$means that A iff is necessary that $\ulcorner A \urcorner$ is true iff A.

But we get then the following:

(30) it is false that $\ulcorner A \urcorner$ means A iff it is false that it is necessary that ($\ulcorner A \urcorner$is true iff A).

This sentence is equipollent with the following two sentences:

(31) it is false that $\ulcorner A \urcorner$ means A iff it is possible that ($\ulcorner A \urcorner$is false iff A);
(32) it is false that $\ulcorner A \urcorner$ means A iff it is possible that ($\ulcorner A \urcorner$is true iff non-A).

However, it is hard to accept that the equipollences after "means that" in (31) and (32) express (within **STT**) the possibilities associated with that it is false that $\ulcorner A \urcorner$ means A. Consider a particular example, namely, the sentence

(33) it is false that the sentence "snow is white" means that grass is green iff it is possible that (the sentence "snow is white" is true iff grass is not green).

It is a fact that the sentence "snow is white" does not mean that grass is green. It is, too, true that

(34) the sentence "snow is white" is true iff grass is not green

is possible (= can be true). Nevertheless, it is not clear why these two facts have to explicate that the meaning of the sentence "snow is white" is different from the one "grass is green."

The absence of commutation between meaning and negation, while the commutation between negation and truth is present, may generally be clarified by the extensionality of truth and falsehood, and the intensionality of meaning.[15] Anyway, analysing (31) — (34) leads to one more question,

[15]I do not claim, naturally, that Davidson did not realize that the contexts of "means that" are intensional. The aim of my argument is to prove that we can not

already mentioned briefly in the previous paragraph. We are asking if the sentence "snow is white" may mean that grass is green. Let us observe, first of all, that an overlapping of the internal contents of quotation-marks determines the sentence name with the sentence itself, as is the case with the name "snow is white," and the sentence meaning that snow is white, has a logically accidental character, and it is dictated by the convenience of such a procedure. Every way to establish names for sentences is a good one, provided that various sentences have various names. It is no use, then, defining a sentence meaning that grass is green by the name "snow is white." However, we must decide that either this name denotes the sentence "grass is green," or the interpretation of a language is as follows: what is standardly (in our *Lebenswelt*) rendered by saying that snow is white, is meant by the sentence "grass is green," though under the name "snow is white." However, it should not be possible, at least if we want to keep up some rudimentary principles — in particular the one that the interpreting mapping has to be a function — that the predicate "is white" has an interpretation in a set of white objects, as well as in the set of green objects. I have an inkling that the main problem for Davidson's conception is not the relations of extensionality of "is true" and intensionality of "means that" rather than a not too clear starting point for the question whether we consider an interpreted, or a non-interpreted language.

At this point, it is essential to make a historical comment as we do not have any direct proof of Tarski's opinion on Davidson's ideas. In Hintikka (2004: 354), there is the following passage:

> Tarski's allergy to applications of the notion of truth in natural languages persisted to his old age. When a week-long Tarski symposium was held at the University of California, Berkeley, on 23-30 June, 1971, Donald Davidson expounded his idea of using Tarski's T-schema as a lynchpin of a theory of natural-language semantics. In discussion Tarski expressed criticism of Davidson's project, and Davidson's paper was not included in the symposium proceedings. [...]

Indeed, Davidson was invited to present a lecture "Coherence, correspondence and convention **T**" (see Henkin, Addison, Chang, Craig, Scott, Vaught 1974: XVII). This lecture has never been published, at least under this title (Davidson 1986 was perhaps a version of it). However, the criticism raised by Tarski did not necessarily refer to the project of semantics for

preserve the intuitive properties of the predicate "means that," by its reduction to the extensional predicate "is true."

natural languages; it could have referred to the question what was primary, truth or meaning. Tarski questioned the combination of the correspondence and the classical theories of truth, which was understandable as well, if what Davidson proposed in 1971 he developed in his article in 1983.

Arguments against Davidson's truth-theoretic semantics have been presented by me at the conference in Kazimierz Dolny nad Wisłą, in October 1995. Here is a quote from Davidson's reply (Davidson 1997: 335):

> Professor Woleński concentrates on what I said more or less thirty years ago, namely, that the words "is true if and only if" in the Tarski **T**-equipollences, if rightly understood, may be interpreted as "means that". As it so often happens when we try to sum up a well-developed argument using one brief slogan, the critics only remember the slogan, and do not remember the context accompanying it.

It is certainly true that the Davidsonian truth-theoretical semantics does not limit itself to the relationship between "is true if and only if" and "means that." But, on the grounds of **STT**, it is hard to handle the complete, extensive context of Davidson's argumentation, as a matter of fact changing with time (see above, and Horwich 1998: 168-169). But, since we are on the subject, some remarks will be in the right place. As I pointed out above, Davidson added some observations about the behaviour of the speakers of a language, to his semantic theory. One of these observations was his version of the compositionality principle, i.e., the thesis that understanding complex expressions depends on understanding their constituents.[16] Another example is the possibility of the so-called radical interpretation, i.e., the possibility of understanding by a person P linguistic expressions used by another person P', without the necessity of considering meanings and attitudes shared by the latter. I am inclined to believe both hypotheses of Davidson (especially the first one) to be empirically false as universal empirical statements, and, regardless of this, I do not see them to be related to the **T**-equipollence. And, my argumentation considers the logic under which falls the predicate "is true" (within **STT**), as well as the logic under which falls the predicate "means that." The conclusion is that these predicates fall under different logical principles, and, if so, then the reduction of meaning to truth conditions is hard to accept. In this case, we have one more reason to claim that **STT** presupposes the concept of meaning, but there is no need to include the latter into the conceptual arsenal of the former.

[16]Davidson applies compositionality in the sense mentioned above to the analysis of intensional environments of the type "person O said that A."

§5. TRUTH, SEMANTIC ANTI-REALISM, MEANING, AND SEMANTIC ANALYSIS OF TRUTH

The problem of the relationship between meaning and truth is also being discussed within the controversy between realism and anti-realism, both with a semantic approach; hence the terms "semantic realism" and "semantic anti-realism." Generally speaking, semantic realism consists of identifying the meaning of expressions with their truth conditions, while semantic anti-realism – with their assertability conditions (in the Polish literature on the subject under consideration, a careful analysis of anti-realism has been presented in the monographs: Szubka 2001, Wieczorek 2005). In general, anti-realists claim that they draw their conclusions from how sentences are used, that is, they assume that meaning consists in use. If the problem is posed in this way, semantic realism reduces itself to truth-value semantics (truth-conditional semantics, as proposed by Wieczorek) in the sense of Davidson, while semantic anti-realism and its justification semantics require further analysis. Philosophers from the Vienna Circle considered meaning as verifiability (or as connected with verifiability, to be more careful). Since they, at least in the first phase, rejected semantics, and, *a fortiori*, the semantic conception of truth, it has been appropriate to consider them anti-realists, as follows from the characterisation above. This was an anti-realism founded on a conviction that syntactics provides adequate tools of linguistic analysis including the notions of verifiability and meaning. Logical empiricists accepted the classical logic. A similar case is Putnam's anti-realism. On the other hand, many contemporary anti-realists, in particular Dummett (1991 and 1993), consider their controversy with the realists as consisting also (or, perhaps, first of all) in the choice of logic, the classical logic as regards realism, or the non-classical one in the case of anti-realism. Or, more precisely speaking, a realist assumes each sentence to be either true or false, and this refers to the classical logic. Hence, this logic must be rejected for the sake of another type (see below). A second interesting question concerns the position of **STT** within this controversy. If one assumes what I am advocating here, that is **STT** does not substantiate the reduction of the sentences' meaning to the truth conditions of these sentences, then this theory cannot be considered a realistic one. Nevertheless, it is commonly interpreted as realistic, or neutral, with respect to realism, but not as an anti-realistic one. This problem needs to be examined in detail.

For convenience, the following schematizations can be introduced (based on McGinn 1980, "use" is replaced by "assertability conditions", symbol $>$ means "transcends," "crosses"). I will begin with the current version.

It looks like this:

(**SRE**) (meaning = truth conditions (**TC**)) $\Leftrightarrow$ semantic realism;

(**SAE**) (meaning = assertability conditions (**AC**)) $\Leftrightarrow$ semantic anti-realism.

What is the relationship that occurs between truth conditions and assertability conditions? With regard to realism we obtain

(35) $\quad \mathbf{TC} > \mathbf{AC}$

that leads to

(36) $\quad (\mathbf{TC} > \mathbf{AC}) \Leftrightarrow \mathbf{SR}$.

I consider the latter formulation an adequate characterisation of semantic realism for it indicates how the truth conception functions with respect to realism. But, there is no reason to deny that semantic anti-realism is rendered by

(37) $\quad (\mathbf{TC} = \mathbf{AC}) \Leftrightarrow \mathbf{SA}$.

Nonetheless, from this it follows that truth conditions with respect to realism, and those with respect to anti-realism, are to be understood in a different way.

According to Davidson (cf. §4), the **T**-equipollences in the sense of Tarski are semantically basic. With respect to (**SRE**), (**SAE**), (35) — (37) might be understood in such a way that the right-hand side formulates a truth condition for the sentence placed on the left-hand side. Thus, within the **T**-equipollence

(*) the sentence "snow is white" is true iff snow is white,

the expression "snow is white" on the left-hand side of (*) is a name of a particular sentence, and the one placed on the right-hand side (standing without quotation marks) determines a truth condition for it. Reversing the direction, we might also claim that the truth condition understood in such a way, is at the same time an assertability condition: we are allowed to assert the sentence "snow is white" in a situation if snow is white. This is exactly

the way how the question has been presented by Tarski (1944: 361). It seems to me that the way the controversy of **SRE** and **SAE** has been verbalized up to now, no doubt connected by the dispute between Davidson and Dummett (cf. the articles in Evans, McDovell 1976), unfortunately is not the right one, for instance because of the twofold aspect of assertability conditions. In order to show the distinction between semantic realism and anti-realism, something must be said in addition. The basic suggestion is derived from the fact that semantic anti-realists construct their semantics on the basis of intuitionistic logic, or on the basis of a logic being a variant of constructivist logic (classical expositions to be found in: Dummett 1991, Dummett 1993, Tennant 1997, Wright 1992, Wright 1993a).[17] A standard practice, here, is the assertability on the basis of mathematical proof, further generalized towards a general assertability on the basis of verification criteria. The essential problem lies in studying the notion of truth in a context of **SRE**, or **SAE**. As regards the former context, truth trancends the assertibility conditions, as regards the latter, it does not. It is not true that the notion of truth does not work within **SAE**, but it is different than the one within **SAE**. For both these views, it is possible to accept the thesis of the priority of meaning over truth, that is, to start an analysis at a point where we have to deal with meaningful sentences. Consequently, I shall treat the controversy between semantic realism and anti-realism as concerning the notion of truth, not the problem of wherein the meaning of sentences consists. Nevertheless, realists and anti-realists differ in what concerns a logical, or semantic, reason in the way of defining meanings, and this question is not neutral to the relationship between meaning and truth.

Here is the typical presentation (according to Grzegorczyk 1967) of semantics for intuitionistic logic (from here henceforth I will not indicate sentences' names with quotation marks). Let i be an available state of information (a primitive notion). A state of information i constrains the acceptance of a sentence A if and only if $A \in i$ (a rule for atomic sentences). A state of information i constrains the acceptance of a sentence $\neg A$ if and only if it does not constrain the acceptance of A (or, if A implies a contradiction); the acceptance of a sentence $A \wedge B$ if and only if it constrains the acceptance of a sentence A, and the acceptance of a sentence B; the acceptance of a sentence $A \vee B$ if and only if it constrains either the acceptance of a sentence A, or the acceptance of a sentence B; the acceptance of a sentence $A \Rightarrow B$ if

[17] One should remember that Putnam is an exception to this. He argued in favor of the consensus theory of truth. Generally speaking, semantic aspects of Putnam's conception are not the foreground aspects, and this is why I will not discuss this position.

and only if it constrains the acceptance of a sentence A **so** it constrains the acceptance of a sentence B; the acceptance of a sentence $A \Longleftrightarrow B$ if and only if it constrains the acceptance of a sentence $A \Rightarrow B$, and it constrains the acceptance of a sentence $B \Rightarrow A$; the acceptance of a sentence $\forall\ x\ A(x)$ if and only if it constrains the acceptance of a sentence $A\ (a)$, for any $a \in i$; the acceptance of a sentence $\exists xA\ (x)$ if and only if there exists $a \in I$, such that a constrains the acceptance of a sentence $A\ (x)$. In terms of verification it may be rendered as follows: (a) if A is an atomic sentence, then a is verified if $A \in i$; (b) $\neg A$ is verified if A is not verified ("A implies a contradiction" is verified); (c) $A \wedge B$ is verified if A is verified, and B is verified; (d) $A \vee B$ is verified if either A is verified, or B is verified; (e) $A \Rightarrow B$ is verified if a verification of A logically is followed by a verification of B; (f) $A \Longleftrightarrow B$ is verified if $A \Rightarrow B$ is verified and $B \Rightarrow A$ is verified; (g) $\forall\ x\ A(x)$ is verified if $A(a)$ is verified for any $a \in i$; (h) $\exists xA\ (x)$ is verified if there exists $a \in I$ then $A\ (a)$ is verified. It immediately is visible that the verification has to be effective. Particularly, we need to show: that $A \in i$ is for atomic formulas, that A implies a contradiction if a negation of A is verified, that both members of the conjunction being verified are verified, that not only an alternation verified must be shown but, too, which of its members guarantees verification that a universal sentence is verified for any piece of information, while an existential sentence — for a specific one. This leads to the rejection of the law of excluded middle, and to the acceptance of the formula $A\ (a) \Rightarrow \exists xA\ (x)$ as a basis for proofs of existence. The assertability conditions for sentences corresponding to this semantics are constructive. Thus we have

(38) $\quad (\mathbf{TC} = \mathbf{CAC}) = \mathbf{SA}.$

This precision enables the discussion between semantic realism and anti-realism to be a polemic around the notion of truth, and it allows more clearly than before to account for the difference between a truth-conditional and a justificationist's conception of truth, if it has been clearly remarked that the justification runs along the lines of constructive assertability conditions.

Semantic anti-realists advance various arguments against the realistic semantics, that is, the semantics of truth conditions, as they define it (for presentation and an extensive bibliography see Szubka 2001; cf. also Gardiner 2000: part I): (a) the vicious circle argument; (b) acquisition argument; (c) manifestation argument; (d) normative argument.

Ad (a). Explaining meaning is circular as, to establish a logical value

of a sentence, we must first understand it, and we can only understand it if its meaning is first known. This argument is nothing new. It was raised by Ingarden (1934) against the verificational theory of meaning developed by the logical empiricists. To an equal extent, it applies to the justificationist conception of meaning, but not to the thesis of semantic realism as presented by (36). For this thesis presupposes (or even must presuppose) that meaning is prior to any further use of language. Its use can influence changes in understanding expressions, make expressions more exact etc., but to do something using a language, requires understanding of the language, even though this happens to be a provisional or unstable understanding.

Ad (b) and (c). Both the arguments indicate that learning (acquisition) of a language and the manifestation of linguistic competence developed in agreement with the rules of anti-realistic semantics. But, those are at most an empirical observance questioned by semanticists and linguists. It is important to observe that mathematicians have no trouble with understanding statements they cannot constructively prove. If anti-realists are right, then we must agree to a highly risky assumption that mathematicians truly do not know what they are talking about, if they, for instance, claim that the axiom of choice and the well-ordering principle are equipollent.

Ad (d). Realistic semantics does not account for the normative aspect of our linguistic practice. Particularly, that meaning is normative. It must be then applied to rules of the type "assert sentence A by virtue of such and such rule." However, each theory of meaning generates such rules, and it is characteristic for the justificational theory that it tries to be the constructive rule type. But, this means only that we should respect constructive rules of assertability. I have already mentioned mathematics, but the matter is still more controversial with respect to empirical statements. We may yet agree to assert a sentence "snow is white" if we see that snow is white, while the matter becomes complicated in the case of sentences not supported by direct experience, but believable by virtue of indirect proof.

None of these arguments, then, can be valid. The problem seems to consist in that we are putting the rules defining the sentences' meaning in a constructive way before the non-constructive ways. There are obviously even good reasons for such preferences, but it is by no means so that realistic semantics is not in agreement with these reasons. As far as the choice between constructive and non-constructive rules is concerned, a realist will be in favor of the former. He, for example, will prefer direct proofs rather than the indirect ones. In this way, we are slowly approaching the gist of the matter, that is the question, if anti-realistic semantics is sufficient. Realistic

semantics is based not so much on the law of excluded middle, as on the two-values principle; every sentence is either true or false. Anti-realists say, it cannot be accepted, particularly, we cannot tolerate sentences that are not true-or-false, independently of the way they have been verified. This applies to sentences (Dummett 1991: 6-8, Dummett 2004, he calls them controversial sentences) about past events, possible future events, or speculations about whose premises are present events, and whose conclusions apply to the past, that is, finally, conditional sentences whose antecedent applies to the past, and whose consequence applies to the present. In such a case, i.e., in the latter example, the antecedent can be verified directly, and the consequence cannot. This means that the verifiability condition of implication has not been fulfilled. Let us then consider any individual example, let it be the sentence

(39) If there was a weather break today, it followed yesterday's winds.

I think there is an automatic transfer of a timeless mathematical verification to a number of individual cases of empirical verification that lies at the base of this argument; an empirical verification has to operate non-stop with information of various time-indices: without this function, the anti-realistic semantics becomes fully irrelevant for empirical sentences. The sentence:

(40) Socrates sneezed on the 28. I. 422, or it is not true that he sneezed at that time,

is true in the classical logic, while anti-realists would be inclined to consider it a nonsense, because we cannot show which possibility has occurred. We cannot, nevertheless, exclude that one day we will find a letter of Plato, or Xenophon, from which we would be able to learn if their teacher had sneezed on that day. Similarly, a sentence like

(41) Poland will have joined the Eurozone before 2010,

cannot be verified now, but it could occur a few years later. Of course we may discuss it if this sentence was true or false at that time (for the discussion on sentences about future actions see Woleński 2003), but it is difficult to claim that it was not intelligible, although it has been true since over a year ago (interestingly, Dummett (2004) accepts the absoluteness of values with regard to propositions, but he refuses to accept it with regard

to statements, although he does not notice that it is not fully in accordance with his own semantics). The fact that it will have been known for a couple of years whether we would be in the Eurozone or not, has nothing to do with the determination of the future by the past actions. If Poland enters the Eurozone, then we will be able to say that someone who thought so had predicted it accurately, and about someone who thought the opposite we will probably say that he predicted it wrongly, but we will not say that he did not know what he was talking about, if he would have made the statement (41) on the 26^{th} of December 2006. Besides, the predictions from the end of 2006 differ from the ones made before the 2005 elections, because the present government (that is, at the end of 2006) in Poland, is more skeptical about joining the Eurozone than the previous one. Examples of sentences that are absolutely not verifiable can be found easily in numerous examples of literary heroes. If one says that Bohun was Skrzetuski's friend, he will meet the objection of falsity, by virtue of the content of *With Fire and Sword* by Sienkiewicz. But, the sentence "Helena Skrzetuska weighed 69 kg" is neither true nor false, for the content of this novel does not solve this problem. Hence, it is not verifiable. The explanation for this is very simple, and it appeals to the fact that literary heroes are objects that are not fully defined. An extension of this thesis on empirical objects is certainly possible, but highly controversial. Anti-realists make, while declaring to stay with their argumentation at the epistemic level, a tacit ontological assumption.

The most important argument against **SEA** is, in my opinion, something that can be shown when we use meta-mathematics.[18] Let us discuss **HA** (Heyting arithmetics, i.e. a theory developed through elimination of theorems questioned by intuitionists, from the logic on which **PA** is based). We can prove that

(42) **PA** is representable in **HA**,

i.e., all arithmetic theorems provable in **PA** are also provable in **HA** (modular intuitionistic logic). The proof of this theorem is constructive, that means (42) belongs to the intuitionistic meta-mathematics. Furthermore we get the following:

(43) If **HA** is non-contradictory, then **PA** is non-contradictory.
(44) If **HA** is non-contradictory, then **HA** is not complete in the sense

[18] A detailed analysis of meta-mathematical concepts and results used in this part of this article can be found in Woleński 2005: chapter VIII.

of Gödel, i.e., we can formulate not provable sentences in its language.

(45) If **HA** is non-contradictory, then the **fact** can be proved neither in **HA** nor in **PA**.

There are such sentences that neither they nor their negations are provable in arithmetics. And, because the arithmetic provability provides the limit for using constructive methods, these sentences transcend constructive assertability conditions. Anti-realists may defend themselves by regarding them senseless. But they have to face a serious problem. The sentence "**HA** is non-contradictory" is one of the Gödel sentences, that is, unprovable sentences. The intuitionist will accept it, but it is not fully known on what grounds. It is usually said that this happens on the basis of a special intuition, but this is a weak defence (see Placek 1999 on analysis and critique of this type of epistemology). But, we must observe that an argument introduced in that way might be found unconvincing by anti-realists. The statements (43) – (45) have been proved in classical meta-mathematics. This applies particularly to (45). The reasoning is as follows: supposing (43), consider monotonicity of provability (if A $\vdash$ B, then Prov $(A) \vdash$ Prov (B). Use counterposition and the rule of modus ponens on the sentence "$\neg \vdash^{PA}$ **PA** is non-contradictory" (the non-contradiction of **PA** is not provable within itself). We subsequently obtain:

(46) If $\vdash^{PA}$ **HA** is non-contradictory then $\vdash^{PA}$ **PA** is non-contradictory.

(47) If $\neg \vdash^{PA}$ **PA** is non-contradictory then $\neg +^{PA}$ **HA** is non-contradictory.

(48) $\neg +^{PA}$ **HA** is non-contradictory.

Moving from (46) to (47) is intuitionally unacceptable. An intuitionist (and also a semantic anti-realist) can always claim that in this way realistic semantics has been smuggled. The truth is, a meta-mathematical argument shows a way to prove, from the realistic positions, which things are bad in anti-realistic semantics. It is even not about the fact that here exist sentences that let us take the incompleteness of **HA** for granted, in particular the statement "**HA** is non-contradictory," but, first of all, that an anti-realist has been constrained to admit that intuition, in a very unclear sense, it, and only it, guarantees the constructive assertability conditions of fundamental statements. Thus, we are allowed to say that the sentence "**C** is an effective assertability criterion" is not effective itself, which, in my opinion, proves that the anti-realistic theory of truth is incomplete. Just as an anti-realist

distinguishes a class of controversial sentences that are perplexing for a realist, a realist, too, has a very effective retaliatory step in that he may easily appeal to controversial sentences that are perplexing for the anti-realist. Dummett (1963) has dealt with undecidable sentences, but he did not observe them being troublesome for an anti-realist. He restricted himself principally to show that the incompleteness of **AR** manifests that the content of the natural number notion cannot be completed by finite axiomatics, but this has no meaning in the case of **SRE** and **SAE**. The realist should, additionally, be aware that his meta-theory is advantageous due to enabling a dialogue with the anti-realist, although the latter would deny this. Furthermore, realists have no good reason to reject assertability conditions in a justificationist sense, if they only add that these apply to the truth criteria, or, to defining the truth in certain cases, not to the notions of truth and meaning.

Is the semantic definition of truth realistic? The answer to this question is 'yes', from a certain point of view, since **STT** implies bivalence. But, there is considerably more to say in this matter. I will begin by presenting a certain argument against the semantic theory of truth as a realistic theory. Ellis (1990) speaks of a fundamental disagreement between the correspondence, particularly semantic, of the theory of truth and that of realism. Although what he has in his mind is the so called scientific realism (that is, a position from which empirical theories appeal to the real world, and they are therefore true or false), his argument has a larger range. Ellis (1990: 161) claims the following:

> A scientific realist that accepts the correspondence theory of truth [...] has a problem with *truth-carriers*. These must exist, that is, be objects of a kind accepted by scientific realists. But, because truths are timeless, if the truth consists in the relationship between the truth-carrier and reality, the truth-carrier, as an element of this relationship cannot be changed. It thus must be either a platonic being, like the eternal sentence or proposition, or something completed, as an utterance event, determined by the time, or even, as a state of the mind, or a belief, a timeless being. For a scientific realist, the truth-carrier cannot be a platonic being, because according to him, such things do not exist. Neither can it be an utterance event, unless its identity depends on the state of mind of a given speaker, or his audience. A truth-carrier, only in a metaphoric sense, could thus be an utterance event. Hence, for a scientific realist, truth-carriers must be specific psychic states. It is better to assume, they are thoughts or beliefs.

Let us consider that the scientific realist cannot be, although this is not so obvious at all, a platonist. To start with the ending — Ellis claims

that thoughts and beliefs make things look better than other truth-carriers, particularly sentences. Not to judge if he is right at this point or not, it is to remember that the semantic theory of truth only presupposes that the truth-carriers are meaningful sentences, and its (not necessarily complete) meaning generates in many ways the interpretations and, what follows, the semantic relations. We can change the interpretations, and, by this, decide upon the change of meaning, in a way the user of a language regards as recommended under these or any other circumstances, for example, when constructing a scientific theory. As it was already pointed out above, (see §4), **STT** is in accordance with the most (or maybe all) famous theories of meaning. This can be also said of the conceptions of mental states, and their role in identifying meaning. Ellis then creates an apparent problem.

The fact that **STT** is semantically realistic, raises no doubts, not only in view of the bivalence as its consequence, but, first of all, because the truth condition for a given sentence, formulated by the right side of a suitable **T**-equipollence, does not constrain a constructive understanding of the assertability criterion. The main difference between the semantic realist and anti-realist consists in that the latter operates with an epistemic notion of truth (cf. Prawitz 1998; the author advocates the anti-realist perspective). If this matter is discussed within the framework of formal semantics, then the notion of truth is defined by the verifiability, or by the acceptance constraint, and it follows the scheme that has been given above in Grzegorczyk. It is sometimes even said (see e.g. Tennant 1997) that there is no principal difference between semantics in the sense of Tarski, and constructivist semantics. It is difficult to agree with this position. Not speaking of differences in defining the sense of conjunctions, because in that the general method is similar, i.e., the recurrential one, the principal difference concerns how atomic sentences are treated. A simple definition of satisfaction in a model is inaccessible to the intuitionist. He must appeal to an information set available to the subject instead. This notion is a primitive one, and it certainly is not equipollent to the information as interpretation. If the intuitionist wants to operate with **T**-convention, he has to read its right-hand side as "A is constructively asserted." When modifying (36), we have (from a realistic point of view):

(49) $\mathbf{TC} > \mathbf{CAC}$,

this is expressing the fact that truth conditions, in the sense of **STT**, transcend constructive assertability conditions. If thus the anti-realist considers

the equipollence

(50) **TC** = **CAC**,

then he understands the truth epistemically, but he in no way abandons the notion of truth. (49) and (50) are as important as to be formulated in words. They mean correspondingly:

(51) realistic truth > anti-realistic truth;
(52) $\forall A$ (A is true iff A is constructively *assertable*).

The two positions are not simply comparable with one another, principally from the viewpoint of **SEA**. Particularly, let us deny (53), from the position of the classical logic, that is accordingly to **SER**. This gives

(53) $\exists A$ (A is not true, and A is constructively assertable), or A is true, and A is not constructively assertable.
(54) $\exists A$ (A is not true, and A is constructively assertable), or $\exists A$ (A is true, and A is not constructively assertable).

The realist can agree to both the components of this alternation because it cannot be excluded that we can constructively prove a sentence to be false, that is, assert it; the second component of the alternation is obvious from a realistic point of view, because there are true sentences that are not constructively assertable. What is more, he may say, he differs from the anti-realist in two aspects, namely, in the one of the notion of truth as well as in the notion of assertability. If the anti-realist accepts a common meta-language for the discussion, he will agree with this opinion, and he will add that he rejects both parts of the alternation (54) because there are no sentences that were simultaneously false and constructively assertable, as well as such that were simultaneously true and constructively not assertable. If the realist denies (50), then he gets (54), if we exclude **TC** < **CAC**. In this case, the anti-realist should agree too. The realistic position provides then a possibility to utter precisely the differences between **SER** and **SEA**. For the anti-realist the situation looks pretty bad. Denying (54) that is allowed to him makes the effect of this operation, i.e. the sentence

(55) $\neg\forall A$ (A is true iff A is constructively assertable),

becomes ambiguous, as it becomes only and exclusively negative. Because the cases (a) **TC** > **CAC**, (b) **TC** = **CAC**, (c) **TC** < **CAC**, use all the possibilities, the anti-realistic denial of (50) can choose (b) as a manifestation of **SAE**,. But, if the anti-realist would like to be completely loyal to himself, he has to say that he truly does not understand his adversary, as he does not know what (a) and (51) mean. This comes to be supported by the conclusion ensuing from the study of the sentence "**HA** is non-contradictory" (using a certain generalization): that the intuition, in a very unclear sense, is the only thing that guarantees the anti-realist to account for his conception of truth.

Sometimes, the anti-realist tries to make some concessions. So does Wright (1992: 33-71, and 1999: Appendix):

(56) A is true iff A is superassertable.

Superassertability is understood in the sense as follows from

(57) A is superassertible iff (a) has been justified by any available state of information, and (b) this justification will be valid independently of any new information.

Truth, in the sense of (56) and (57), is thus eternal. Wright accepts two other principles:

(58) It is a priori taken for granted that all truths in a given domain are knowable.

(59) States of information related to a given domain are timelessly available.

Principle (59) has to reject truths that are beyond the proofs. But, considering (58), if A is true from the proof e, so it is true at any other moment as well, including past events. Truth as superassertability is hence eternal too. Let us, then, assume that A is true. Consider a sentence $\neg A$, that is, the sentence $A \Rightarrow \perp$, where $\perp$ is the sign of contradiction. If all the proofs for A are timelessly available, and no proof can justify contradiction (in the constructivist sense), then there exists (in the constructivist sense) no proof for the $\neg A$. So this is not a true sentence. Since A is arbitrary, we have

(60) $\forall A$ (A is true, or A is not true).

Because Wright has given no definition of falsity, we cannot judge how (60) behaves according to the bivalence principle. But, if falsity is defined as refutation by means of at least one proof, so the negation of a true sentence is refutable by any proof confirming this sentence in that each of them verifies the antecedent of the implication $A \Rightarrow \ \perp$, and it cannot verify the consequence of it. Then, the negation of every superassertable sentence is false. And, this leads to bivalency. Superassertability semantics proves to be constructive. But this question is still open, since Wright's notion of falsity is unclear. Independently of this, (56), as it is explained by (57), has an unexpected consequence. Let us assume that A is true, that is, superasserted. If this is so, then A cannot be refuted by any proof e, past, present, or future. That means, A is a tautology, since it belongs to the consequences of every sentence expressing e. But the consequence that every true sentence is a logical truth, is difficult to accept.

§6. FINAL REMARKS

Though the aim of this article has not been to provide a definition of meaning, the analyses made, nevertheless, suggest an essential conclusion. If a truth-conditional explication of the context of "x means (that) y" is not acceptable, so it is the pragmatics, not the semantics, that is the right topos, for the notion of meaning. It is not only a matter of location of such or other reflections on language but also a reason for a rather radical distinction between semantics as a model theory, and semantics as a theory of meaning. In this respect, the intuitions of logicians (Tarski, Quine) seem to work considerably better than the ones shared by linguists. It also does not play any greater role if we speak of the meaning of expressions rather than of using them. Anti-realists correctly emphasize the relevance of language use, but a realist is able to share this view without making any objection. This implies that a supporter of **STT** can say of his definition of truth, it presupposes a standard use of expressions, if it has not been decided to be otherwise. We also may say that meaning is in language (or, if we prefer, is closely connected with language) if the language is an interpreted one. Although such a statement certainly does not explain the ontological nature of linguistic expressions, it certainly makes semantics as model theory easier.

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Anna Pietryga

THE LEXICOLOGICAL ASPECTS OF *THE LOGIC OF COMPLEMENTARITY*

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"The Logic of Complementarity" by Costa and Krause is a system of paraconsistent logic designed for theories that include complementary descriptions of their fields, which are considered to be a source of contradiction. In fact, in such cases contradictions arise not due to complementarity itself, but as a result of a taciturn agreement on semantics. For this reason, it may be proposed that a modification of lexical semantics of the complementary descriptions is needed as an addition to the new consequence (relation) introduced in the logic of complementarity.

"The Logic of Complementarity" was introduced by Newton de Costa and Décio Krause (2003a) in an article bearing this very title. It is a paraconsistent logical framework, i.e. one that a) allows a sentence to exist as a thesis both in a negated and non-negated form and b) does not get trivialized if it begins to contain such contradictory theses. In this particular case, the complementarity of the logical system is achieved by the application of a "filter" — an alternative consequence relation introduced by the authors into classical logic (the question whether such a modified logical framework can still be considered "classical" is of no importance with regard to the present article and shall not be discussed). The new relation is based on the classical one, allowing a given thesis to be derived from a set of formulas A, on the condition that it 1) constitutes an element of this set or 2) is a classical tautology or 3) is a consequence of a non-contradictory subset of set A as defined by classical logic (2003a: 15). Thus, a system of logic that uses the new type of consequence relation cannot get trivialized.

The new logic was tailored to the needs of contemporary science due to the so-called "complementarity" of its theses. The term COMPLEMENTARITY is usually used in the context of physics, but its creator, Niels Bohr — the (co)author of the Copenhagen interpretation of quantum mechanics did not limit the use of the mentioned term to his own scientific domain (2003a: 1, 7). Da Costa and Krause admit that there is no general agreement regarding the exact meaning of the COMPLEMENTARITY PRINCIPLE introduced by Bohr (2003a: 10).[1] For the purpose of their logical framework, the two researchers assumed Max Jammer's definition, according to which a THEORY OF COMPLEMENTARITY is a theory which includes (at least) two descriptions of its subject matter pertaining to the same universe, neither of which would present a satisfactory depiction of the phenomenon if regarded separately, but would be contradictory if combined (2003a: 11). The new logical framework is created especially for such COMPLEMENTARY theories.

The abovementioned definition of complementary theories makes no explicit mention of the inner contradictions (or a lack thereof) between particular descriptions within the theory. However, since the contradictions that have emerged when these descriptions are compared are treated as an unwelcome *novum*, it may be assumed that the original descriptions contained no inner contradictions.

One is tempted to ask what conditions must be fulfilled for a combination of two non-contradictory descriptions to be contradictory. It is not difficult to imagine a situation when two witnesses offer testimonies that contain no inner incongruity, but contradict one another. Such cases are, however, only one example of the situation that the authors of the logical framework had in mind. They emphasise that complementary sentences do not always negate one another and that in general it is only the conclusions made from each of the sentences that are mutually contradictory (2003b: 22). Da Costa and Krause explain this with the help of a well-known example: in classical logic the sentences: "x is a particle" and "x is a wave" do not constitute immediate negations of one another, but if one is true, the other must be false ("'x is a particle' ENTAILS that x is not a wave", 2003a: 18). That is why in "classical logic" it is possible to derive a contradiction from a pair of complementary sentences, thus justifying the creation of a paraconsistent "logic of complementarity".

I am of the opinion that classical logic alone is not able to educe the

[1] K. Popper (1974: 104) states that even Albert Einstein "in spite of the greatest effort" could not understand "what Bohr meant by complementarity".

contradiction from a pair of sentences such as "Adam Mickiewicz is a football player" and "Adam Mickiewicz is a football club". Noticing the problem requires a knowledge of semantics of the language used in the combined sentences – which would in this case include knowing the relation between the scope of meaning of the two names (FOOTBALL PLAYER and FOOTBALL CLUB), understanding their application with regard to the subject and knowing whether the subject is a proper name and, if it is so, what is its type. Logic simply does not have such knowledge at its disposal, and therefore cannot be the sufficient means of educing the contradiction, unless it obtains more information regarding the mentioned issues (pertaining to the vocabulary used). Since there is no "official" addendum of the required type, da Costa and Krause most probably prove the existence of the contradiction by means of enthymemes, using the implicit premises of the language.

These premises were mentioned by Kazimierz Ajdukiewicz, as early as in 1934. His scope of research included "meaning directives" and the conceptual apparatus specific to a given language (1985a: 154ff.; 1985b: 176ff.). In a work focusing on the latter issue, he proposes a distinction between sentences which stand in direct and indirect contradiction. If two sentences are in "direct contradiction", one of them constitutes a negation of the other. Sentences in "indirect contradiction" are not directly contradictory, but a direct contradiction may be deduced from them through a "meaning directive" (1985b: 180n.).

What Ajdukiewicz understood by "meaning directives" may perhaps merit an explanation. The examples given in his work (1985a), and the accompanying commentary, point to the fact that such a directive compels the user of a given language to consider certain conclusions expressed in this language to be correct. To demonstrate this, Ajdukiewicz uses examples from Polish and from the language of arithmetic. The first of these is the so-called "rule of detachment", which is present in the Polish language: if a user accepts a conditional sentence *if A, then B* and he accepts the sentence *A*, they should also be willing to accept the sentence *B*. Otherwise Polish language speakers would not be ascribing the right meanings (i.e. those assigned to the Polish language expressions) to the words they were using. The second illustration pertaining to the mentioned term is taken from the language of arithmetic, where the sides of an equation (the author uses the example of a definitional equation: $2 = 1 + 1$) may be used interchangeably in any given sentence (1985a: 155). (Ajdukiewicz lists three types of the meaning directives — inferential, axiomatic and empirical, but makes the reservation

that these are just "some" of the types found in "existing" languages[2] and that he does not claim to be presenting a full list) (1985a: 154).

It is therefore apparent that the concept of sentences in indirect contradiction corresponds to da Costa and Krause's notion of complementary theories. The two approaches are also similar in the fact that both the two Brazilian researchers and Ajdukiewicz notice the linguistic aspect of the issue, just as Bohr did: in a passage quoted by da Costa and Krause, Bohr states that all physical descriptions, regardless of what they pertain to, are expressed in colloquial language, adapted to the scale of phenomena known to us from everyday experience, according to which the categories of particle and wave are mutually exclusive (da Costa, Krause 2003a: 5)[3] (In this respect, the achievements of modern physics resemble the views of Nicholas of Cusa, who believed that the "reconciliation of opposites" is simply a matter of scale. See: Nicholas of Cusa, Hopkins 1981: §40, §67).

Da Costa and Krause point out the existence of the language problem in physics, but make no attempt to solve it. They mention the SEMANTIC PRINCIPLES, that may, however, pertain not to the language used by the scientists, but, in case of some inferences, to the modifications of logical operations, as may be concluded from the authors' laconic comments (2003a: 11, 14) and from the solutions they chose to employ. The logical system presented by the two Brazilian researchers obviates the destructive results of overflow, but does not eliminate its undesired causes. It is perhaps justified to ask whether in cases where the logic of complementarity offers a logical "detour" of an unsafe element of a theory it would not be more advisable to modify the corresponding fragment of semantics. In 1929 Arthur Eddington proposed that fantastic vocabulary taken from the poem *Jabberwocky* (Gribbin 1997: 91ff)[4] be used to denote the mysterious physical entities of the

[2]Which languages may be considered "existing" remains an open question. Everyone is likely to agree that both living, natural languages (ethnic languages) and artificially created languages of logic and mathematics can be considered "existing". It is uncertain, however, whether the term may be applied to dead languages and why.

[3]On the scale of phenomena that may be directly experienced by human senses, the wave aspect and the corpuscular aspect may also appear together, but usually one of them visibly dominates, which is why the other one can be disregarded (this applies e.g. to the wave aspect of a railway engine). See: e.g. Gribbin 1997: 91; cf. da Costa, Krause 2003a: 8-9.

[4]Neither the quoted passage of Eddington's work, nor Gribbin's comment include the name of the author of the poem, known for his *Alice in Wonderland* (Carroll 2000). Carroll is mentioned only by the anonymous author of the Polish translation. It is possible that the two scholars were not familiar with Carroll's simple suggestions on how to understand and remember what *toves* and *borogoves* are.

(sub)atomic level. Over sixty years later, the astrophysicist John Gribbin made the same suggestion, in order to prevent people from associating these entities with objects known to them from empirical experience ("an atom is a ball and an electron is a tiny particle"). Such a solution may be a bit too radical, but has essentially the same effect as the application of "the logic of complementarity" (which was designed later): it detaches the terms from undesired associations.

The quantum theory contains some fragments in which the complementarity of descriptions proves to be a problem. In an earlier work, da Costa (1974) states that it is possible to isolate particular sentences that constitute "bad theorems" as they appear in a theory both with a preceding negation and without it. The possibility of finding particular problematic NAMES (such as the one offered by "the logic of complementarity") would be a step forward, as the same troublesome noun, whose creation would be difficult to foresee, may appear in many sentences just like a bad penny. Correcting the nomenclature may obviate the emergence of many different types of contradiction.

How could such a correction of vocabulary used in cognitive processes be achieved? It would have to refer to the semantics used. I do not propose the creation of a full and comprehensive contemporary theory of categories — such a task would be impossible, due to the large number, richness and variability of the systems of natural language (including the many professional dialects, full of specialist vocabulary — including the vocabulary used by physicists). Aristotle might have thought that the theory of categories he created was ideally general. It was much easier to hold such views in times when many aspects of language had not yet been reflected upon, such as the fact that different languages categorise phenomena in dissimilar ways. Research in this field has made us more cautious, but nonetheless attempts at creating a "universal language" are still being undertaken.

What seems a more feasible and perhaps sufficient solution to the problem mentioned is revising the so-called semantic field, which includes troublesome expressions. A semantic field is a set of abstractly understood words called *lexemes*.[5] A lexeme combines in itself the meaning ascribed to a given term, its grammatical functions (e.g. main verb, copula, auxiliary verb) and all inflected forms it may take (e.g. all forms of person, gender and case) (Urbańczyk 1978: 172). Lexemes belonging to a semantic field are joined by a "superordinate term", e.g. all of them pertaining kinship

[5]On the difficulties in formalising the theory of semantic fields see: Lyons 1984: 259.

(Polański 1999: 444; Lyons 1984: 259). They are related to one another "vertically", creating "paradigmatic relations", i.e. in cases when one word may be interchanged with some others (*36 times 4* vs. *36 plus 4*), as well as "horizontally", creating "syntagmatic relations", i.e. the ways words may be possibly connected to form phrases and sentences (*a dog — is barking*). A semantic field may be studied (or perhaps CONSTRUCTED?) by means of introspection as well as through text analysis or the analysis of the lexical material included in dictionaries (Miodunka 1989: 142f).

The interrelations between lexemes include e.g. semantic hypernymy and hyponymy (Lyons 1984: 281-282), as well as various types of antonymy. This last relation is of particular importance to the presently discussed subject. Lyons (1984: 270) uses this term to denote the relation between the two poles of a gradable opposition (e.g. *hot/cold*). In his view, antonymy is one of three types of opposition, along with the so-called complementaries, i.e. the relations between the sides of a non-gradable opposition (e.g. *odd/even*) and converses, i.e. the opposing sides of an asymmetrical opposition (e.g. *brother/sister*). Jozef Mistrík lists all of these types of antonymy and adds a fourth one: contextual antonyms, also referred to as pragmatic antonyms, among which he counts e.g. such pairs as *bitter/sweet* and *sweet/sour*. Obviously, this classification can hardly be called complete, but further consideration of this issue would not fit into the spatial constrains of the present article. Lyons humbly admits that many lexemes with logically opposite meanings are not usually listed among antonyms — e.g. the pair *red/blue*, not to mention countless pairs such as *tree* and *dog*, *square* and *abstract*, etc. (1984: 264).[6] It should be added that the pair *wave/particle* is usually absent from any list of antonyms.

The number of possible approaches to this issue is a problem in itself, as well as by the difficulties in describing the field of research. Some uncertainty has already arisen at the level of describing complementaries. Mistrík calls them "complementary antonyms" (the similitude of the term with the notion of complementarity may be misleading) and states that in such a binary pair of opposites negating one side is tantamount to asserting the other, exemplifying this with pairs such as *dead/alive*, *day/night* and *man/woman.*[7]

[6]Such oppositions, inconspicuous as they may be, were considered the raw stuff of language by Ferdinad de Saussure (de Saussure 1983).

[7]Mistrík's examples of complementary antonyms includes the pair *truth/lie* which is obviously a simplification — such an opposition does not take into consideration cases of giving false information unintentionally or for didactic (!) reasons, e.g. to explain the substitution of *salva veritate* (Marciszewski 1988: 54). When it comes

Mistrík does not explain what he understands by "negating one side" of a binary pair, but the lexical examples he gives (*not dead = alive*) allow us to assume that he meant negating a SENTENCE in which the mentioned side of the binary pair acts as a predicative (1985: 122). The examples of complementary sentences presented in Urbańczyk's encyclopedia (1978: 20) are constructed in this way; according to Urbańczyk such a relation exists between the sentences *John is not married* and *John is a bachelor*.

Mistrík calls the complementaries "contradictory" (*kontradiktorické*) antonyms and places an equals sign between the negated predicative (e.g. *not dead*) and its complementary pair (*alive*), even though the relation between the two is merely that of the so-called OPPOSITION (Marciszewski 1988: 90-91) (there are subjects in relation to which none of the sides of this equation is used — e.g. iron ore is neither dead nor alive, as are all examples of inanimate objects).[8] The simplification used by Mistrík is also used in one of the most recent Polish publications on the subject of semantic relations between words. This work identifies opposition with complementarity and gives examples for the mutual relation of implication between the negated predicate and its complementary (*'X is not dead' implies that 'X is not alive'*, *'X is not alive' implies that 'X is dead'*. See: Żmigrodzki 2003: 175).

In the hitherto discussed work, Mistrík does not concern himself with the nature of subjects that may be used in sentences with complementaries, perhaps in the belief that the situation is too well-known to be discussed. Few readers will conclude that if a pen cannot be described as a day or as a woman, it must consequently be a night and a man. However, what is obvious to the users of a given language may still constitute a challenge for an analytic of semantics. The fact that scholars notice the complexities of language and attempt to classify them is not a mistake. A notable and rare example of well-constructed textbooks on lexical semantics is *Semantics* by Lyons, who notes that in the case of non-gradable opposition only one side of the binary pair may be used with a given subject, IF the antonyms in questions MAY be PREDICATED ABOUT the given subject (1984: 264).

In the case of complementaries there are reasons to think they are the natural building material for contradictory sentences, but it is easily noticeable that pragmatic antonymy as understood by Mistrík does not, by any means, create a direct contradiction or an opposite that would be

to complementaries, it should perhaps be added that words may carry a number of meanings. For example the complementary antonyms of the word *free* include *occupied*, *attached*, *enslaved*, which does not mean these three can be considered synonymous.

[8] With the possible exception of batteries, which may be described as dead.

independent on the context – as evidenced by the existence of sweet-and-sour sauce. Similarly, there are contexts in which a *wave* and a *particle* are not mutually exclusive. For this reason, antonyms based on complementary descriptions of the same reality may be, in the limited context of the field of these descriptions, considered to be not complementary, but contextual.

In such a case, it would be sufficient to reconcile alternative descriptions by substituting — in some contexts — the mentioned antonyms with their common hyperonym (which may be called CONTEXTUAL due to its limited application in this capacity). This is where we are led by the theory of relativity, which postulates substituting the terms *time* and *space* (useful in describing the phenomena of everyday life, outside the spectrum of the theory) by the word *proper length*. It is perhaps justified to ask whether the lexis of the languages we are presently using does already contain a universally recognised hyperonym for the terms *wave* and *particle*. From a philosophical and literary point of view, an obvious candidate for such a hyperonym would be a word like *wavicle* or *partiwave* — created analogously to the term *grue*, used to denote a colour that changes in time, described in Nelson Goodman's paradox (Audi 1995: 306-307).[9] From the point of view of modern science, however, it may perhaps be better to employ the term "wave packet" used to describe wave representation of localised particles.[10] This term could be considered the answer to the problem of a "contextual hyperonym" for the words *wave* and *particle*.

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[9] *Grue* is also the literary term denoting a monster, derived from an old Scottish verb from which the contemporary English word *gruesome* is derived; see: http://en.wikipedia.org/wiki/Grue_(monster) and *The Concise Oxford Dictionary*. The wordbuilding technique used to coin the terms *wavicle*, *partiwave* and *grue* is analogous to the one employed by Carroll to create the words *burble* and *mimsy*.

[10] See: e.g. www.if.edu.pl/~pluta/pl/dyd/plg/w-fiz/w22/segment3/main.htm.

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Marian Przełęcki

THE PROBLEMS OF ETHICAL INTUITIONISM

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Ethical intuitionism is the theory of cognition of moral facts and, what's closely related, a theory that explores the meaning of moral judgments. I've been a proponent of this theory discussing it in some of my writing, most notably in *Sens i prawda w etyce* [*Sense and Truth in Ethics*], published as a 49^{th} volume in the "Biblioteka Myśli Semiotycznej" series (Przełęcki 2004).

Part I of this paper addresses criticisms that Anna Jedynak raised in her review of my book (Jedynak 2005).

In part II, I will discuss a theory of moral behaviour proposed by Bogusław Wolniewicz in two of his articles (Wolniewicz 2006, 2007). I consider the idea of moral cognition following from his conception and contrast it with the notion of moral cognition and moral meaning that follow from ethical intuitionism.

I hope that the following discussion will help clarify and explain the main ideas behind ethical intuitionism considered as an epistemological and semiotic theory, however problematic it may appear to be.

I.

The problems of ethical intuitionism discussed in this paper were first noted by Anna Jedynak in her review of my book *Sens i prawda w etyce*. Let me first say that the review provides an excellent presentation of my ideas, and its brief and to-the-point exposition sets an example that I couldn't possibly follow. Being appreciative of this effort I will try to address criticisms pointed out in the review as they seem to ideally capture difficulties with my meta-ethical standpoint. In doing so, I will pass over some critical remarks

that take issue with my perhaps not entirely fortunate terminology because I may at any time alter the wording of particular phrases while keeping their sense intact.

Before I proceed to the gist of the matter, allow me first to say a few words in defence of my methodological approach which met with Jedynak's criticism. Namely, she's critical of the assumption, which considers to be mine, that the user of language (to whom she refers as "everyman") is the best theoretician of the language he speaks. But I'm never going as far as to make this methodological claim. The user of a language is not theorizing about language, he usually doesn't speak his mind about such notions as "sense" or "truth" of linguistic expressions. What I do believe is that a competent user of language is somebody to be reckoned with. I'm also risking an assumption that this competent user of language is behaving as if to suggest that his evaluative expressions resonate with ethical intuitionism which I'm trying to defend in my book. Which means that he treats them as expressions which are different from pure descriptions in that they're charged with an evaluative attitude, and one which can be reasonably discussed. I never considered this assumption to be unassailable, it's a working hypothesis which, if it's to hold, must survive verification.

Criticisms or comments appearing in Jedynak's review examining ethical intuitionism advanced in my book focus primarily on the role of emotion in cognition of moral facts, which I understand as singular acts of moral intuition. The following suggestion made by Ajdukiewicz in his 1938 work *Propedeutyka filozofii* [*Introduction to Philosophy*], understands this experience as an emotional reaction to a specific action which can be morally judged. With this reaction, we directly "see," to quote Ajdukiewicz, moral value of the action, or its "emotive quality" as it's sometimes called. This value comes in a moral predicate attributed to the action. "Similarly to acts of perception which constitute the basis for judgments of perception, emotion allows us to see the value of an object, and basing on this experience we often articulate judgments about this particular value" (Ajdukiewicz 1938). The moral predicate, as far as we understand it here, can be conceived on equal terms with empirical characteristics. The predicate "morally good" (where "good" means as much as an expression of "goodness"), which I discuss in the book, is characterized by equivalence: "a morally good deed is an altruistic deed (following from a concern for the good of another human being)." In my approach, this equivalence, let's call it R, is treated as an empirical generalization. This is also the crucial point of the objection raised by Jedynak as she leans toward treating R as a definitional rather than

empirical equivalence, and therefore "essential" rather than "accidental," especially if she's inclined to believe that some of my phrases seem to be supporting this particular interpretation.

In my book, I was trying to interpret things differently primarily because this approach favours naturalistic interpretation which construes ethical appraisal as something of a descriptive rather than evaluative nature. In my opinion, however, this descriptive nature no longer corresponds with its ordinary meaning. But things are not as a simple as they would seem. In her review, Jedynak proposed at least three conceptions to counter my position, each allowing ethical appraisal to retain its particular nature when compared with ordinary descriptions. In each of those conceptions, this peculiarity follows from the act of moral intuition, or emotive reaction of approval or disapproval attributable to specific behaviour.

The first conception builds on Ajdukiewicz's idea of "rationalization" of language, where an empirical generalization with sufficient evidence is "elevated to the dignity of a principle." This would be the case of our R, no longer empirical generalization but a semantic postulate determining the meaning of "morally good." It would be a naturalistic definition of the predicate, but in its origin the definition would have a peculiar emotion of moral approval, which, revealing moral soundness of specific behaviour, would at the same time allow us to construe R as an empirical generalization. This is where naturalistic definition of moral predicate would differ from a purely descriptive one. The origin of the definition would make the whole difference.

The next conception, similar to the first one, essentially follows the argument proposed by Ajdukiewicz in his 1939 paper *O sprawiedliwości* [On Justice]. According to this view, "anytime behaviour evokes a very particular feeling of moral approval which we struggle to express in words, we consider this behaviour to be morally sound." But this "feeling of approval is but a criterion of our moral appraisal, not its substance." (I'm not sure, however, how this could be reconciled with another opinion expressed by Ajdukiewicz where he argues that "one would be abusing the meaning (*sic*!) of the term "sound" if one was to balk at using this word to judge behaviour which has won our moral approval"). In his paper, Ajdukiewicz treats moral soundness as a vague notion, "a notion which defies definition." In my book, however, I was rather focusing on moral goodness and in this sense I was characterizing morally good deeds through the equivalence R. If we were to treat this relationship, as Jedynak suggests, as a definitional equivalence, a morally good deed and altruistic deed would mean one and the same thing. Thus,

the notion would not be evaluative, but descriptive, evaluative being only its criterion.

The third conception proposed by Jedynak construes moral intuition differently than I do, employing the idea of intuition "a priori" as opposed to my intuition "a posteriori." While the latter is an emotive experience showing us the moral value of a specific deed, the former purports to show the "essence" of a morally good deed. Intuition "a posteriori" constitutes direct justification of moral appraisal in an individual case, while intuition "a priori" does it generally, thus upholding some moral principles. As it puts the equality sign between the essence of a morally good deed and its altruistic quality, *R* would be such a principle. Under this interpretation, it wouldn't be a relationship of empirical, but rather of "a priori" character, and therefore not "accidental" but "essential," following from a particular moral intuition which is general and abstract. It's possible that this intuition would also be in some way present in our emotional reaction to a particular deed, but it would attribute moral value not only to this particular instance, but also to any other deed that would be "like this one." (Although I feel distant from this conception, I once shared a similar axiological experience: "It was an axiological reaction to a particular situation, but it allowed me to discover general axiological truth, as natural and legitimate a generalization as it was forceful" (Przełęcki 2005: 94).

As things stand, the first two conceptions put forward by Jedynak put ethical notions in a naturalistic perspective, the third one maintains evaluative sense of those notions, but only for the price of bringing in the idea of moral intuition "apriori" which to me seems to be a problematic mechanism of cognition. These are the main reasons why I would like to avoid those three solutions. I still feel closest to "inductionist intuitionism" which I was defending in my book, where I proposed to treat emotive reaction to a particular deed as a cognitive experience which reveals to us its moral value. I'm naturally well aware that my position entails some difficulties and Jedynak points them out with skill. Out of all the alternatives proposed in her review I feel least disinclined to accept the one which reiterates the argument put forward by Ajdukiewicz in 1939. Although the notion of a morally good deed would be here in its substance of descriptive nature, definable through altruism, for example,its criterion would nevertheless be emotive, secured by the feeling of moral approval that we discussed earlier. Such predicates would differ from empirical predicates, if not in substance, than in the character of its criterion. Thus, I feel I can give it a pass.

I would like to address in this paper further questions that my ethical

"inductionistintuitism" raises. They concern this peculiar attitude of moral approval which we "struggle to express in words," as Ajdukiewicz says. Moral attitudes evoked by particular deeds can be, generally speaking, positive or negative, pleasant or unpleasant. They're often characterized as a feeling of moral approval or disapproval. In the first case one can speak of emotive reactions to altruistic deeds, in the other to egoistic deeds. Through these attitudes we can "see" the moral value of a particular deed. "Moral disgust towards someone's behaviour makes me see its wickedness," wrote Ajdukiewicz. One argues that moral attitudes drive our behaviour: the feeling of approval towards a particular deed makes us strive to make it happen, the feeling of disapproval makes us strive to have it prevented. But isn't it an oversimplification? Aren't our motives for moral behaviour rotted in some greater depths? It seems to me that those deeper motives for moral behaviour can be found in feelings of empathy, the ability to share with others their joy and suffering. The latter in particular is considered to be crucial to moral life. In this world made of suffering the most important moral deeds are those which seek to shield others from calamities, the present or looming suffering. Their deepest motivation comes from empathizing feeling with the suffering individual, from making us want to ease his plight. This is why a deed pursuing this end evokes the feeling of approval, shows us the moral value of the deed itself. Consequently, this attitude becomes a motive guiding our behaviour, which comes from the feeling of compassion. This, precisely,made me once express the belief that the source of morality lies in our ability to pity others.

Here, and in our discussion beforehand, we have ultimately no other choice but to follow linguistic intuitions, by necessity vague and therefore open to various interpretations. Jedynak is presenting them in a very compelling way. All meta-ethical approaches laid out by Jedynak are essentially acceptable as it seems that they're not entirely out of touch with our linguistic intuitions. The choice of this or another approach ultimately belongs to the individual with his general philosophical preferences, the methodological postulates he's inclined to accept, and, finally, personal experience. And we must bear this in mind when we are arguing for one particular solution in this regard.

II.

In his recent work titled *Hedonizm i obowiązek* [Hedonism and Obligation], Bogusław Wolniewicz (2006, 2007) proposes an original conception of moral behaviour, which for all its theoretical value, insightfulness and precise language can be rightly regarded as a "serious" theory of the matter it

seeks to present. A theory of moral cognition is one crucial part of his considerations. This point makes me compare Wolniewicz's theory with the conception of moral cognition which I was on numerous occasions advocating in my theoretical pursuits, most notably in *Sens i prawda w etyce*. Not exactly a new idea, the conception is a version of a meta-ethical standpoint that one calls "ethical intuitionism." It seems to be closest to what Ajdukiewicz proposes in his work *Propedeutyka filozofii* (1938), in the part titled "Postępowanie człowieka" [Behaviour of Man]. It discusses human behaviour while advancing a particular conception of moral behaviour and the associated notion of moral cognition.

Since the texts I'm referring to are rather easy to get hold of I won't be presenting here their arguments at length, allow me to focus only on what's essential for comparison of their chosen elements. I will, for the time being, pass over different purposes of our inquiries, only pointing out that whereas I'm trying to find out what is the moral value of a specific deed, Wolniewicz is concerned with moral appraisal of the individual. Let's therefore consider a simpler case of moral obligation in a particular situation. In a nutshell, Wolniewicz's conception looks as follows.

Let's assume that the person has to deal with a particular situation s. His "theoretical reason" informs him that he can chose between two options, p and p" (where p" entails not-p), and therefore he may chose to pursue state of affairs p or p". This information reaches what one may call the "interest" of a person, that is, his needs in general, and precipitates utilitarian emotion e^u, which causes, for example, the person to feel more pleasant, or less disagreeable, when p" than p. At the same time, the information reaches "practical reason" which provides us with moral appraisal of those behaviours that we may choose from, ultimately boiling down to guidance that one should rather pursue a state of affairs p, for example. This awareness quarrels with a conflicting emotion e^uwhich tells us to pursue p". For those two to conflict, however, the awareness must transform into a particular moral emotion e^m, which makes it for the person more pleasant, or less disagreeable to pursue p rather than p". This, argues Wolniewicz, is contingent on the person's "character," which may be either good or bad. With the former, the impulse of moral emotion e^m corresponds with the moral obligation, as in our example; with the latter, it doesn't. "There are some who revel in evil, their moral emotions gone awry." Only when the moral awareness is worked by a character into moral emotion e^mcan it be compared with e^u which evokes an emotion that is decisive as to which end to pursue. Human beings, argues Wolniewicz, will eventually seek a more pleasant solution.

Therefore, "practical reason creates a conflict between desire and obligation, but has no authority to judge either way, which falls to the character, the basis of ethical behaviour."

However incomplete it may be, this brief summary of the theory of moral behaviour proposed by Wolniewicz suffices to point out differences between his conception and the theory of moral behaviour which I find most convincing. The major difference between our views lies in moral cognition. In my opinion, the conception advanced by Wolniewicz doesn't sufficiently differentiate between the evaluative and descriptive character of moral behaviour. What our "practical reason" tells us is not just an assertion, it's shot through with emotive attitude. Apart from its intellectual constituent it also has an emotional constituent. At least this is how we understand phrases like "it's a noble deed" or "it's a wicked deed" when we encounter them in daily life.

This particular substance of ethical language is perhaps best accounted for in the aforementioned version of ethical intuitionism proposed by Ajdukiewicz (1938). The act of ethical intuition is perceived here as an emotive attitude of sorts. Emotion is the ultimate source of values, encompassing also ethical values. Ajdukiewicz sees direct cognizance of values in the same way as he sees direct cognition through perception. Much like perception brings about sense qualities of the object, its value comes with emotive experience. "Because perception of an object carries with it an impression of redness, the object appears as red. By the same token, because the thought about a particular object is associated with pleasantness or unpleasantness, when we think about an object we see it as having this or that quality. (. . .) In my feeling of moral repulsion for somebody's action I can see the wickedness itself. It's as direct as my looking at a flower tells me it's red."

This briefly outlined conception of moral cognition proposed by Ajdukiewicz raises various questions and doubts, which I address in *Sens i prawda w etyce*, particularly in chapter II. My reservations, however, do not concern the gist of the theory which is crucial to our present considerations, that being an emotional component of any ethical appraisal. It's our emotionally motivated reaction that makes us see its "emotive quality," construed as its positive or moral value. This emotional component in ethical appraisal entails also the presence of volitional components: emotion is bound up with will. An ethical appraisal is, as meta-ethicians say, not only emotional, but also prescriptive. Which is why, according to Ajdukiewicz, ethical valuation by itself serves as a motive to pursue particular ends. If it's positive, that is, if it's a positive emotional reaction to a particular deed, it makes us pursue

a particular end; if it's negative, it makes us reject it. Thus, the agency of a personal "character" postulated by Wolniewicz is no longer required. Moral emotion e^m, ostensibly driven by character,is already there since, in addition to its descriptive substance, it already holds emotive and prescriptive aspects. "Practical reason" produces value judgments rather then mere descriptions. This, among others, sets them apart from predications of "theoretical reason."

The above conception of moral cognition and its effect in the form of value judgments and norms greatly simplifies the mechanism of ethical motivation suggested by Wolniewicz. The question remains, however, whether this simplified mechanism can account for all ethical phenomena that Wolniewicz wants to explain in his paper.

Wolniewicz's theory seems to be least appealing while accounting for morally wrong behaviour. He tries to explain it through the notion of character: if it's bad, it sends an impulse that goes against obligation. "Practical reason" says that one should pursue p, but this awareness, filtered through a bad character, becomes a moral emotion that makes it more pleasant to pursue not-p rather than p. It's pleasant for a man with a bad character to do wrong.

This is not an outcome one could accept on the grounds of the theory of moral cognition which I'm, following Ajdukiewicz, subscribing to. The awareness that one should pursue p is here, owing to it emotional character, necessarily bound up with positive moral emotion, pleasure evoked by a thought about pursuing p. My character cannot get in the way of what my "practical reason" prescribes. How, then, make sense of so many cases when one purses what is indisputably wrong? Here one can essentially differentiate between two situations.

The first one involves behaviour when ethical appraisal went wrong as not every value judgment is by necessity morally right. Much like perception can mislead us, one may be misled while attributing"emotive qualities," or values, to objects, following the emotion they invite. This "emotive illusion" would suggest that only emotional feelings experienced in "optimal" conditions make up the right substance for value judgments. Some of these conditions include intellectual and emotional ability such as sufficient knowledge about the object in question and impartiality. "Ideal observer theory," one of the conceptions discussed in meta-ethical literature, is an attempt to codify those "optimal" conditions for emotional experiences. If they're not satisfied, our "practical reason" can be leading us to make wrong ethical conclusions, mistakenly judging wrong deeds as morally good. This would

make it sufficiently clear as to why we would want to behave in this way.

But this doesn't explain why we would like to pursue the moral wrong even if we know it to be so, something Wolniewicz feels very strongly about. "There's no such thing as 'moral lunacy,' what there is, however, is pure malice." According to views on moral behaviour and cognition which I'm defending here, one may treat it as a result of a conflict between pursuing good of the others as opposed to pursuing good of oneself. Adopting Wolniewicz's vocabulary, it's a conflict between "practical reason" and "interest," where "interest outweighs obligation." The "interest" in question would have to be understood in a sufficiently broad manner. These "needs in general"would include, for example, a strong desire to vent one's antipathy towards someone, in the wake of some sort of a quarrel, for example. One would weigh the moral wrong done to the person and the pleasure associated with malicious behaviour, with the latter ultimately winning over the displeasure of the moral wrong (note that one must feel this displeasure if one is to be aware of the moral wrong of one's behaviour).

Among other implications, doing away with "character" as a "basis of ethics" invites a particular interpretation of "conscience," a notion that is crucial to moral behaviour. According to the view espoused by Wolniewicz which I too find convincing, conscience can be construed as a "recognition or intuition of what's good and what's wrong, coupled with an inner urge to pursue good." Wolniewicz argues that these two constituents, intellectual and emotional, follow from two "modules" of personality: practical reason and (good) character." Which leads him to the conclusion, disagreeing with Kant, that not everyone has conscience. Since there's an emotion in moral cognition and moral judgments, one may assume that conscience is a voice of practical reason which gives us both an "intuition of what's good" and an "inner urge to pursue good" that is bound up with this feeling. This makes us believe that any given "normal" individual, that is, capable of moral evaluation of his actions, has conscience.

Save for a few arbitrary declarations, it is not my purpose to discuss here the notion of character proposed by Wolniewicz in his theory. For Wolniewicz, character is made up of a set of emotional dispositions which are not morally indifferent, this is why the character can be either "good" or "bad," ultimately making human beings good or bad. Wolniewicz argues that character is unchanging and innate, one is born with it to the world and there's nothing that can be done to change it. One would imagine that these are some general empirical claims which only empirical science can confirm or refute. As it is with other claims of the so- called philosophical

anthropology, the only evidence Wolniewicz can cite in support of his views is daily observation and personal experience. Drawing on similar sources, I'm inclined to propose a different claim and argue that character is, at least to some degree, acquired and can be shaped. It seems to me futile to debate who's right.

This difference however, causes major ethical implications. Contrary to Wolniewicz, who's concerned with ethical appraisal of the individual, I'm less willing to judge men, seeking rather ethical evaluation of the deed itself. This follows not only from my theoretical convictions where ethical appraisal of individuals is a risky venture. It's also an evangelical maxim "don't judge" which I embrace as part my moral convictions. I may judge the deed, if that's necessary, but not the man. But even so, instead of saying categorically "this deed is good, this one is bad," I'm rather inclined to make comparisons "this deed is better than the other." In my book *Sens i prawda w etyce*, particularly in chapter VIII, I was trying to explain what makes me favour "ethics of moral preference" over "ethics of moral obligation." I won't be doing this here.

Ending these brief and sketchy remarks, I would like to take one more opportunity to draw attention to the main source of differences between the standpoints I've just discussed. For me, they come from different conceptions of moral cognition and, what's closely associated, the moral meaning of judgments. I believe that cognition is sourced from emotional reactions to particular deeds, which means that a certain emotional component is associated with the result of cognition. For Wolniewicz, however, this emotional component, which he calls "moral emotion," is present in moral judgments only through the agency of character. Which is why it's crucial to his theory of moral behaviour. Any attempt to resolve this difference would call for semiotic analysis of terms used in normative ethics, which, as the wealth of meta-ethical literature suggests, is something which goes well beyond our present discussion.

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Jakub Szymanik

COMPUTATIONAL SEMANTICS FOR MONADIC QUANTIFIERS IN NATURAL LANGUAGE[1]

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It is the striving for truth that drives us always to advance from the sense to the reference.

Gottlob Frege, *On Sense and Reference*

Two persons understand an expression in the same meaning if they, at a moment of actually understanding it, not only have the same thing in mind, but also if the understanding of that expression provides them with the same method of deciding whether that expression is applicable to a certain object or not.

Kazimierz Ajdukiewicz, *Pragmatic Logic*

1. Problem formulation

One of the interesting problems in the theory of language is the problem of describing and explaining the mechanisms responsible for our ability to understand sentences. A description of the mechanism of linguistic competence, which we can refer to as semantic competence, is necessary for understanding the phenomenon of language. For to use a language is not only to use a certain vocabulary and grammatical rules, but most of all to associate certain meanings with certain expressions. For example, when I say *rana* ("wound" in Polish, "frog" in Latin), it is the intended meaning that decides whether I use the Polish or the Latin language — i.e. whether what I had in mind was a frog or a wound (see Ajdukiewicz 1931).

[1]Author's note: the article is based to a large extent on my MA thesis. I would like to thank my supervisor, Prof. Marcin Mostowski, for suggesting the subject and helping me to prepare the work. I am also grateful to many other people for inspiring discussions. Special thanks to Nina Gierasimczuk.

An important element of this task is to describe the truth conditions of natural language sentences — and that is exactly what semantics deals with. It usually comes down to describing the function which ascribes to every correctly constructed expression a certain set-theoretical object constructed in the universe of the model and being an extension (denotation) of this expression. Which is why this type of language studies is often referred to as purely extensional. The technical aspects of this approach were developed by Alfred Tarski (1933). They were successfully applied to the semantics of a natural language by Tarski's student Richard Montague (see the collection of his works in Thomason 1974).

There is a tradition, initiated by Gottlob Frege (1892), to think about the meaning of language expressions as the 'mode of presentation' of their denotation. Here, the meaning of an expression can be understood as the procedure of searching for its extension. The first explication of the Fregean distinction between *Sinn* and *Bedeutung* with the use of the computational theory apparatus appeared in the work by Pavel Tichý (1969). At the Logic Colloquium in 1990, Yiannis Moschovakis presented a paper in which he elaborated on Frege's ideas, referring to the notion of algorithm, although without mentioning the work of the Czech logician (Moschovakis 1990).

Several years earlier, in *Semantic Automata*, Johan van Benthem initiated studies on quantifiers in natural language from the perspective of the computational theory (van Benthem 1984; cf. van Benthem 1986, 1987, Clark 1996). Johann A. Makovsky and Yachin B. Pnueli (1995) made a review of the logic problems related to computational semantics for quantifiers. As regards monadic quantifiers, they have been systematically discussed by Marcin Mostowski (1998).

Also some purely linguistic works include an approach to semantics of a natural language from the perspective of the computational theory (e.g. Suppes 1982, Bunt 2003, Piasecki 2004). The aforementioned article by Tichý, together with his later work (Tichý 1971), has initiated an entire current of research devoted to computational linguistics under the name Transparent Intensional Logic. The main aim of this research is to answer the following question: "What are meanings of linguistic expressions?" (Hajicova, Materna, and Sgall 1988). Linguists from Amsterdam make a direct reference to Moschovakis (van Lambalgen and Hamm 2004a, 2004b).

In this article, we shall discuss computational semantics for quantifiers in natural language from the perspective of human cognitive mechanisms. We shall equate the procedure of enumerating the denotations of an expression with its referential meaning. In this work, we do not take up the issue of other

possible methods of identifying the meanings of linguistic expressions (cf. e.g. Mostowski 1994). Through a detailed analysis of a selected fragment of language conducted using the tools provided by logic and the computational theory, we shall attempt to come closer to answering the following questions:

— How can language users recognise the denotation of language expressions?

— Why are some sentences more difficult than others?

— What is the nature of meaning of a given expression?

We shall start with discussing, with examples, the methods of assigning to quantifiers the procedures which help identify the denotation of a sentence and with explaining the reasons why we restrict ourselves solely to discussing finite structures. The next chapter is devoted to discussing the finite and push-down automata, and in the subsequent one we introduce the concept of monadic generalised quantifier. Elements of computational theory and logic allow us to precisely describe the relations between monadic quantifiers in natural language and the corresponding algorithms. These findings, in turn, let us formulate a psychological hypothesis on the possible methods of interpreting sentences with quantifiers. We also discuss the latest neurological research that seems to confirm our thesis. In the last chapter, we once again analyse the sentences discussed in the introduction. With that example, this time in the precise language of computational theory, we illustrate the idea of treating the referential meaning of a sentence as an algorithm calculating the logical value of the sentence in finite universes. We also discuss the consequences of identifying the meaning of a sentence with the algorithm enumerating its extension for the problem of synonymy of sentences.

2. Quantifiers and procedures

Quantifiers in natural language, e.g. *every*, *some*, *at least five*, *the same number of* correspond to certain procedures which determine their interpretation. Let us consider the following sentences:

1. *Every book in this library was published after 1900.*

2. *Exactly three books in this library have plastic covers.*

3. *Most books in this library were published after 1980.*

4. *In this library there is the same number of pink books as yellow ones, and the same number of green books.*

We understand these sentences, but in order to determine their logical value we have to use certain procedures (algorithms) that are defined by quantifiers used in the sentences. Let us now describe examples of such procedures, starting from the simplest quantifying expressions.

(Re 1) In order to determine the logical value of the first sentence, we

take cards from the complete catalogue of the library and we check the dates of publication. We proceed until we find a book published before 1901 or until the end of the catalogue. This procedure always ends at some point, as there is a finite number of books, one card corresponding to each book, and we never look at the same card more than once. If we finish this procedure before we go through the whole catalogue, it means that one of the books was issued before 1901 and thus sentence (1) is false. Otherwise, if we look through the entire catalogue without encountering a book published before 1901, sentence (1) is true.

(Re 2) Sentence (2) will be true if and only if:

5. *At least three books have plastic covers*

and at the same time:

6. *No more than three books have plastic covers.*

In other words, we have to verify two conditions: (5) and (6). Again, we analyse all the books one by one. If we look through the entire book collection and find less than three books with plastic covers, sentence (5) is false, therefore, sentence (2) must be false as well. If at some point during the search we find the third book with a plastic cover, we have to start analysing sentence (6), i.e., further browse the collection searching for plastic covers. If we find at least one more, sentence (6) is false; therefore sentence (2) is false as well. Otherwise, sentence (6) is true and (2) must be true as well. In order to execute this algorithm, we have to go through the whole book collection. During the search, we have to remember one of five things — that we have found no books with plastic covers, that we have found 1 such book, 2 such books, 3 such books, or that we have already found more than 3 books of this kind.

(Re 3) In order to verify the truth value of sentence (3), we take card by card and begin stacking them up into a single pile on a separate table in the following way: we start the procedure by putting the first card on the stack, also whenever the stack is empty we just put the current card on top. Then, if the top card on the stack represents a book published after (before) 1980, then if the next card also documents a book published after (before) 1980, we put this card on the top and now this one is the top card. Otherwise, that is if the top card is a book published after (before) 1980 and the next card documents a book published before (after) 1980, we take the top card off the stack. Sentence (3) is true if and only if, after looking through the whole catalogue, we have at least one card of a book published after 1980 left on the stack. In order to execute this procedure, we have to go through the whole collection, but this time we use additional help in the

form of the stack, which theoretically can contain any number of catalogue cards. Consequently, determining the logical value of sentence (3) is more difficult than calculating this value for the previous sentences.

(Re 4) The procedure for calculating the truth value of sentence (4) resembles the algorithm for sentence (3), but this time we need at least two stacks: one to check, just as in the previous example, whether the number of pink books equals the number of yellow books; the other to compare the number of green books with the number of pink and yellow books.

We take books one by one and check the colours of their covers. If we are holding a pink (yellow) book, then we place it on the first stack according to the same rules as in the procedure for sentence (3). Every time we process a yellow book, we place its copy also on the second stack according to the following rule: if the second stack is either empty or the top book is yellow, then we add the yellow book to the top; if the top of the second stack is occupied by a green book, then we pop it out of the stack (i.e. match it with the yellow book). If we grab the green book, we should use it on the second stack: if the stack is empty or there is another green book on top, we just push it on top; otherwise, if there is a yellow book on top, we take it off the stack. The sentence is true if after processing the entire library both stacks are empty.

By using the conceptual apparatus of the automata theory, we can precisely describe and compare such procedures.

3. Finite universes

Authors dealing with the semantics of natural language usually focus only on considering models with finite universes (see e.g. Montague 1973, Westerståhl 1989). Intuitively, this seems to be enough to adequately describe the semantics of natural language. In most communication situations, we refer to relatively small universes of discourse. For example, the sentences:

— *Exactly five children of John have completed university education*,

— *Most of John's children have started legal practice*,

— *John has the same number of daughters, sons, and nephews*

are naturally interpreted in a finite universe — John's family.

Another reason for the restriction to finite universes may be problems with intuitive interpretations of semantics of some natural linguistic expressions in infinite universes. For example, when analysing quantifiers such as *more* or *most*, we understand the expression "More xs are φ than ψ" in the following way: "There exist more xs satisfying formula φ than those satisfying formula ψ". We thus reduce the problem of meaning of these expressions to a question about the corresponding relations between the

sets of elements satisfying the relevant formulae. In finite universes, there is a commonly accepted solution, which is to compare the cardinal numbers of these sets. But extending this solution to infinite universes seems to be counterintuitive. Let us consider the following sentences:

— *Most natural numbers are composite numbers.*

— *More points in space are occupied by stars than by planets.*

The sentences are meaningful and, in addition, they intuitively seem true. But if, as in the previous case, we interpret the quantifiers in these sentences in terms of relations between cardinal numbers, we should obviously consider these sentences false (cf. Krynicki and Mostowski 1999).

The above argument in favour of restricting oneself to finite interpretations is obviously insufficient. Although such a restriction would essentially simplify our theoretical considerations, it leads to the omission of many important cases. Nevertheless, in this article we will focus only on a finite model, which seems an acceptable assumption in the context of natural language considerations. From our point of view, another advantage of this restriction to finite universes is also that the procedures for searching denotations of linguistic expressions take an algorithmic (effective) character. Thus, we can pose a meaningful question about the computational complexity of certain constructions in natural language (Mostowski and Wojtyniak 2004; cf. Sevenster 2006, Mostowski and Szymanik 2012).

Sentences (1)—(4) clearly differ in terms of difficulty — the content gets more and more complex with each sentence. This difference is related to the increase in the complexity of the algorithms that can be used to verify the truth value of the sentences. Namely, various semantic mechanisms with various computational complexities correspond to various classes of linguistic expressions. Therefore, a description of semantic competence must consist in providing a set of algorithms, each of which corresponds to a class of expressions and formalises the method of searching for denotations of the expressions belonging to this class. In this article, we shall describe the algorithms corresponding to the meaning of monadic quantifiers in terms of their computational complexity.

4. Automata

The theory of automata deals with the analysis of abstract calculating machines. In the 1930s, Alan Turing introduced the concept of deterministic and non-deterministic (choice) automata and defined the general model of computation, later called the Turing machine (Turing 1936). In the 1940s, research was initiated on simpler machines, called finite automata. In the next decade, this research coincided with Noam Chomsky's theory of grammar.

Grammars in Chomsky's hierarchy correspond to classes of automata that recognise languages generated by these grammars (Chomsky 1957). In the 1960s, the automata and theory of grammar proved to be a useful tool for developing high-order programming languages, thus contributing to the development of information technology (see Hopcroft, Motwani, and Ullman 2001, Rosenberg and Salomaa 1997).

4.1. Basic concepts of mathematical linguistics

An ALPHABET is a non-empty finite set of symbols. For example,

1. $A = \{a, b\}$ — a binary alphabet;
2. $B = \{0, 1\}$ — another binary alphabet;
3. $C = \{a, \ldots, z, A, \ldots, Z\}$ — a set of Latin alphabet symbols;
4. $D = \{$when, a, dog, runs, it, eats, quickly$\}$ — an alphabet of a fragment of the English language;

A WORD is a finite sequence of symbols selected from a given alphabet, e.g. the string "111000111010100101" is a word over alphabet B, while the string "a dog runs quickly" is a word over alphabet D.

An EMPTY WORD is a sequence without alphabet symbols. It is marked with the letter ε.

The LENGTH OF A WORD is the number of symbols occurring in it. We write $lh()$ for length, e.g. $lh(111) = 3$ and $lh(\varepsilon) = 0$.

If Σ is an alphabet, then by Σ^kwe mean the set of all words of length k over alphabet Σ. For instance, $\{0, 1\}^3 = \{000, 001, 010, 011, 100, 101, 110, 111\}$. For every alphabet Σ, we have $\Sigma^0 = \{\varepsilon\}$. For any letter a and natural number n, by a^n we denote a string of length n consisting only of letters a.

The SET OF ALL WORDS OVER ALPHABET Σ is denoted by Σ^*, e.g., $\{0, 1\}^* = \{\varepsilon, 0, 1, 00, 01, 10, 11, 000, \ldots\}$. In other words, $\Sigma^* = \bigcup_{n\in\omega} \Sigma^n$. Such a set is almost always infinite, except for two cases: for $\Sigma = \varnothing$ and $\Sigma = \varepsilon$.

By xy we mean the CONCATENATION of the word x with the word y, i.e. the new word xy is built from x followed by y. If $x = a_1 \ldots a_i$, and $y = b_1 \ldots b_n$, then xy is of length $i + n$ and $xy = a_1 \ldots a_i b_1 \ldots b_n$. For instance, if $x = 101$ and $y = 00$, then $xy = 10100$. For any string α, the following holds: $\varepsilon\alpha = \alpha\varepsilon = \alpha$. Hence, ε is the neutral element for concatenation.

Any set of words selected from Σ^* for a certain alphabetΣ is called a LANGUAGE. If Σ is an alphabet and $L \subseteq \Sigma^*$, then we say that L is a language over Σ. For instance, the subset $L \subseteq A^*$ such that $L = \{\alpha$: the number of occurrences of a and b in α is even$\}$ is a language over alphabet A. The set J of correct sentences in English is such that $J \subset D^*$ is a language over the alphabet for a fragment of the English language.

4.2. Finite automata

Definition 1. *A non-deterministic finite automaton (FA) is a tuple* (A, Q, q, s, F, δ)*, where*:

— A *is an input alphabet;*

— Q *is a finite set of states;*

— $q_s \in Q$ *is an initial state;*

— $F \subseteq Q$ *is a set of accepting states;*

— $\delta: Q \times A \rightarrow P(Q)$ *is a transition function.*

If $H = (A, Q, q_s, \delta, F)$ is a FA such that for every $a \in A$ and $q \in Q$, $card(\delta(q, a)) \leqslant 1$, then H is a deterministic automaton. In that case, we can describe a transition function as a partial function: $\delta: Q \times A \rightarrow Q$. Finite automata are often presented as graphs where vertices symbolise internal states, an arrow marks the initial state, an accepting state is double circled, and arrows between the states describe a transition function on letters represented by the labels of these arrows.

Let us now define the generalized transition function $\bar{\delta}$, which describes the behaviour of an automaton reading a string w in state q:

$$\bar{\delta}: Q \times A^* \rightarrow P(Q), \text{ where:}$$
$$\bar{\delta}(q, \varepsilon) = \{q\}$$
$$\text{and for each } w \in A^* \text{and } a \in A, \bar{\delta}(q, wa) = \bigcup_{q' \in \bar{\delta}(q, w)} \delta(q', a)$$

The language accepted (recognised) by some FA H is the set of all words over the alphabet A which are accepted by H, that is: $L(H) = \{w \in A^*: \bar{\delta}(q_s, w) \cap F \neq \varnothing\}$.

A language $L \subseteq A^*$ is regular, if and only if there exists some FA H such that $L = L(H)$. Moreover, we know that deterministic and non-deterministic finite automata recognise exactly the same class of languages (regular languages).

4.2.1. Examples

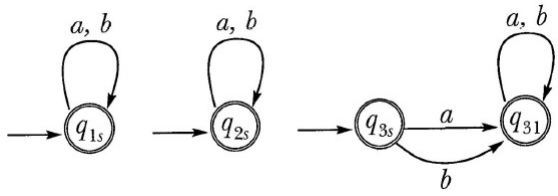
We will now describe some simple examples of regular languages together with the corresponding finite automata.

Let $A = \{a, b\}$ and let us consider the language $L_1 = A^*$. $L_1 = L(H_1)$, where $H_1 = (Q_1, q_{1s}, F_1, \delta_1)$ such that: $Q_1 = \{q_{1s}\}$, $F_1 = \{q_{1s}\}$, $\delta_1(q_{1s}, a) = q_{1s}$, and $\delta_1(q_{1s}, b) = q_{1s}$.

Let $L_2 = \varnothing$; then $L_2 = L(H_2)$, where $H_2 = (Q_2, q_{2s}, F_2, \delta_2)$ such that: $Q_2 = \{q_{2s}\}$, $F_2 = \varnothing$, $\delta_2(q_{2s}, a) = q_2$, and $\delta_2(q_{2s}, b) = q_{2s}$.

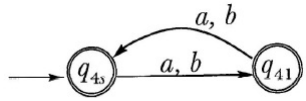
Let $L_3 = \{\varepsilon\}$; then $L_3 = L(H_3)$, where $H_3 = (Q_3, q_{3s}, F_3, \delta_3)$ such that: $Q_3 = \{q_{3s}, q_{31}\}$, $= F_3 = \{q_{3s}\}$, $\delta_3(q_{3s}, i) = q_{31}$, and $\delta_3(q_{31}, i) = q_{31}$for $i = a, b$.

Figure 1. FA recognising L_1, L_2 and L_3.



Now let $n_x(w)$ mean the number of occurrences of letter x in word w. We will describe the language in which the only words consist of a different number of occurrences of letters a and b in terms of parity. Thus $L_4 = \{w \in A^*: n_a(w) \not\equiv n_b(w)(\text{mod}2)\}$. $L_4 = L(H_4)$, where $H_4 = (Q_4, q_{4s}, F_4, \delta_4)$ such that: $Q_4 = \{q_{4s}, q_{41}\}$, $F_4 = \{q_{41}\}$, $\delta_4(q_{4s}, i) = q_{41}$, and $\delta_4(q_{41}, i) = q_{4s}$, for $i = a, b$.

Figure 2. FA recognising $L_4 = \{w \in A^*: n_a(w) \not\equiv n_b(w)(\text{mod}2)\}$.



Let us observe that we can describe this language in other words as a set of all words of odd length over a binary alphabet.

4.2.2. Simple bracket structure and the pumping lemma

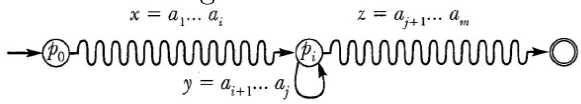
Finite automata accept regular languages. But not all languages are regular, and the finite memory of FA is not enough to recognise some of them. For example, consider languages containing a simple bracket structure $L_{[]} = \{[^n]^n: n \geqslant 1\}$. Words of this language can be arbitrarily long, and in order to recognise them, a machine needs to remember the left brackets and check whether the number of left brackets is equal to the number of right brackets. A string from this language can start with any number of left brackets, so the corresponding machine needs to be able to memorise any natural number n. To that end, we need a machine equipped with a memory that would allow for memorising the number of symbols "[", which can later be compared to the number of symbols "]". However, a finite automaton with k states can only remember numbers smaller than k. This claim is precisely formulated in the following lemma:

Theorem 1. (Pumping lemma for regular languages) *For any infinite regular language $L \subseteq A^*$, there exists a natural number n such that for every word $\alpha \in L$, if $lh(\alpha) \geqslant n$, then there are x, y, $z \in A^*$ such that:*

1. $\alpha = xyz$

2. $y \neq \varepsilon$
3. $lh(xz) \leqslant n$
4. For every $k \geqslant 0$*, the string* $xy^k z$ *also belongs to L.*

Figure 3. Every word longer than the number of states of an automaton forces it to go back to a certain state.



One example of a language that is not regular, as it contains a bracket structure, is the set of all correct expressions of propositional calculus. The problem here is the description of the grammar of two-argument conjunctions, in case of which the formula is correct if the brackets are correctly located. Another non-regular language is English, which has grammar constructions such as *if. . . , then*, *either. . . or*, and grammatical relations between the subject and the predicate, which can be interpreted as an obligatory relation between expressions.

The debate on the regularity of grammars of natural languages was one of the most important topics in the beginnings of mathematical linguistics. Noam Chomsky proved that the English language is not a regular language (Chomsky 1957). Let us take as an example a fragment of the English language composed of the following sentences:

1. *The cat died.*
2. *The cat the dog chased died.*
3. *The cat the dog the rat bit chased died.*
4. *The cat the dog the rat the elephant admired bit chased died.*

The above sentences take the following form:

(noun phrase)^n(transitive verb)$^{n-1}$ intransitive verb

Language $L = \{a^n b^{n-1} c\colon a \in NP,\ b \in TV,\ c \in ITV\}$, where NP — noun phrase, TV — transitive verb, ITV — intransitive verb, is obviously not a regular language, according to the pumping lemma.

4.3. Push-down automata

Definition 2. *A non-deterministic push-down automaton (PDA) is a tuple* $(A, \Sigma, \#, Q, q_s, F, \delta)$*, where:*

— A *is an input alphabet;*
— Σ *is a stack alphabet;*
— $\#$ *is a stack's initial symbol;*
— Q *is a finite set of states;*
— $q_s \in Q$ *is an initial state;*

— $F \subseteq Q$ *is a set of accepting states;*

— δ*:* $Q \times (A \cup \{\varepsilon\}) \times \Sigma \rightarrow P(Q \times \Sigma^*)$ *is a transition function. We denote a single transition by:* $(q, a, n) \; H \rightarrow (p, \gamma)$*, if* $(p, \gamma) \in \delta (q, a, n)$*, where* $q, p \in Q$*,* $a \in A$*,* $n \in \Sigma$*,* $\gamma \in \Sigma^*$*.*

The language recognized by PDA H is the set of strings w over alphabet A that are accepted by H. In other words, starting to read the string w in the initial state q_0 with an empty stack, the automaton H terminates in an accepting state $p \in F$. If, in addition, the stack is empty after w has been read, we say that H accepts over an empty stack.

We say that a language $L \subseteq A^*$ is context-free, if and only if there exists a PDA H such that $L = L(H)$.

The class of context-free languages is naturally larger than the class of regular languages. Language $L_{[]} = \{[^m]^m : m \in \omega\}$, which we know to be non-regular, is context-free. In order to prove this, we will construct a PDA H such that $L_{[]} = L(H)$. Let $H = (A, \Sigma, \#, Q, q_s, F, \delta)$, where $A = \{[,]\} = \Sigma$, $Q = \{q_s, q_1, q_2, q_a\}$, $F = \{q_a\}$, and the transition function:

— $(q_s, [, \#) \; H \rightarrow (q_s, \#[\,)$
— $(q_s, [, [\,) \; H \rightarrow (q_s, [[\,)$
— $(q_s,], [\,) \; H \rightarrow (q_1, \varepsilon)$
— $(q_s,], \#) \; H \rightarrow (q_2, \varepsilon)$
— $(q_1, \varepsilon, \#) \; H \rightarrow (q_a, \varepsilon)$
— $(q_1,],]\,) \; H \rightarrow (q_2, \varepsilon)$
— $(q_1, [,]\,) \; H \rightarrow (q_2, \varepsilon)$
— $(q_1,], \#) \; H \rightarrow (q_2, \varepsilon)$
— $(q_1, [, \#) \; H \rightarrow (q_2, \varepsilon)$

H recognises $L_{[]}$, reading the string from left to right and recording every encountered "[" on the stack. After finding the first "]", H takes"[" off the top of the stack when reading the "]". If at the end of reading of the whole string the stack is empty, H accepts the string. Thus H accepts only those strings that contain the same number of left and right brackets.

Restrictions for context-free languages are described by a relevant version of the pumping lemma, from which it follows that language $L_{abc} = \{a^k b^k c^k : k \geqslant 1\}$ is not context-free.

Theorem 2. (Pumping lemma for context-free languages) *For every context-free language* $L \subseteq A$*, there is a natural number* k *such that for each* $w \in L$*, if* $lh(w) \geqslant k$*, then there exist* $\beta_1, \beta_2, \gamma_1, \gamma_2, \eta$ *such that:*

— $\gamma_1 \neq \varepsilon \vee \gamma_2 \neq \varepsilon$
— $w = \beta_1 \gamma_1 \eta \gamma_2 \beta_2$
— *for every* $m \in \omega$*:* $\beta_1 {\gamma_1}^m \eta {\gamma_2}^m \beta_2 \in L$*.*

Currently, there is a debate among linguists, whether the syntax of natural languages is context-free. Most scholars are inclined to believe that the expressive power of context-free grammars is enough to describe the grammar of a natural language, but some quote counterexamples (such a debate may be found, for instance, in Gazdar and Pullum 1985, Pullum and Gazdar 1982, Shieber 1985). We shall show that the power of context-free languages is definitely not sufficient to describe the semantics of natural language.

5. Monadic quantifiers

Many natural language quantifiers are not definable in elementary logic. For example, it is impossible to express in first-order logic that the number of elements satisfying a given formula is even or finite. These characteristics may be expressed in first-order logic enriched by additional quantifiers. The concept of generalised quantifiers was introduced by Andrzej Mostowski (1957), who examined the possibility of adding such quantifiers as *there exist uncountably many* or *there exist infinitely many* to the elementary logic. Each of these quantifiers binds exactly one variable in one formula. Per Lindström provided a more general definition of quantifiers (Lindström 1966), according to which each structural characteristic of models can be expressed as a generalised quantifier. Richard Montague initiated research on the semantics of natural language with the use of a generalised quantifier (Montague 1973). Many works have been devoted to the concept of generalised quantifiers and their use for linguistic description (see e.g. van Benthem 1986, Barwise and Cooper 1981, Mostowski 1994, Westerståhl 1989). Below we shall only discuss monadic quantifiers in finite models.

Definition 3. *Let K be a class of tuples (U, R_1, ..., R_n) closed under isomorphism, where $U \neq \varnothing$ and $R_i \subseteq U$, for i=1, ..., n. K determines the interpretation of the monadic quantifier Q_K. For any model M and valuation $\bar{a}$ in M, the following holds:*

$$M \models Q_K x(\varphi_1(x), \ldots, \varphi_n(x))[\bar{a}] \Leftrightarrow (|M|, {\varphi_1}^{M,x,\bar{a}}, \ldots, {\varphi_n}^{M,x,\bar{a}}) \in K,$$

where |M| is a universe of model M, and $\varphi^{M,x,\bar{a}}$ is a set determined by φ in M using the variable x with valuation $\bar{a}$. The quantifier $Q_K$of type (1, 1, ..., 1) binds one first-order variable in n formulae. We define the set of logic formulae $L(Q_K)$ by adopting standard rules of creating formulae for first-order logic and in addition: if $\varphi_1, \ldots, \varphi_n$ are formulae and x is an individual variable, then $Qx(\varphi_1, \ldots, \varphi_n)$ is a logic formula L(Q).

5.1. Examples

Existential quantifier ($\exists$) For every model *M*, the following holds:

$M \models \exists x\varphi(x)[\bar{a}] \Leftrightarrow card(\varphi^{M,x,\bar{a}}) \geqslant 1 \Leftrightarrow (|M|, \varphi^{M,x,\bar{a}}) \in K_E$

The class of models K_E determining the interpretation of the existential quantifier is described as follows:

$K_E = \{(|M|, R) : R \subseteq |M| \wedge R \neq \varnothing\}$

Universal quantifier ($\forall$)

$M \models \forall x\varphi(x)[\bar{a}] \Leftrightarrow \varphi^{M,x,\bar{a}} = |M| \Leftrightarrow (|M|, \varphi^{M,x,\bar{a}}) \in K_A$,

$K_A = \{(|M|, R) : R = |M| \wedge R \neq \varnothing\}$

Parity quantifier (D_2)

$M \models D_2x\varphi(x)[\bar{a}] \Leftrightarrow card(\varphi^{M,x,\bar{a}})$ *is divisible by 2* $\Leftrightarrow (|M|, \varphi^{M,x,\bar{a}}) \in K_{D_2}$,

$K_{D_2} = \{(|M|, R) : R \subseteq |M| \wedge card(R) = 2k,$ *where* $k \in \omega\}$

Divisibility quantifier (D_n)

$M \models D_nx\varphi(x)[\bar{a}] \Leftrightarrow card(\varphi^{M,x,\bar{a}})$ *is divisible by* $n \Leftrightarrow (|M|, \varphi^{M,x,\bar{a}}) \in K_{D_n}$,

$K_{D_n} = \{(|M|,R) : R \subseteq |M| \wedge card(R) = kn,$ *where* $k, n \in \omega\}$

There exists exactly m ($\exists^{=m}$)

$M \models \exists^{=m}x\varphi(x)[\bar{a}] \Leftrightarrow card(\varphi^{M,x,\bar{a}}) = m$

$\Leftrightarrow (\exists x_1, \ldots, x_m(\varphi(x_1) \wedge \ldots \wedge \varphi(x_m)) \wedge \forall z(\varphi(z) \Rrightarrow z = x_1 \vee \ldots \vee z = x_m)$,

$K_{\exists^{=m}} = \{(|M|,R) : R \subseteq |M| \wedge card(R) = m\}$

Most (Most)

$M \models$ Most $x(\varphi_1(x), \varphi_2(x))[\bar{a}] \Leftrightarrow card({\varphi_1}^{M,x,\bar{a}} \cap {\varphi_2}^{M,x,\bar{a}}) > card({\varphi_1}^{M,x,\bar{a}}$ - ${\varphi_2}^{M,x,\bar{a}})$

$\Leftrightarrow (|M|, {\varphi_1}^{M,x,\bar{a}}, {\varphi_2}^{M,x,\bar{a}}) \in K_{Most}$,

$K_{Most} = \{(|M|, R_1, R_2) : R_1, R_2 \subseteq |M| \wedge card(R_1 \cap R_2) > card(R_1$ - $R_2)\}$

The same number of (TS)

$M \models TSx(\varphi_1(x), \ldots, \varphi_n(x))[\bar{a}] \Leftrightarrow card({\varphi_1}^{M,x,\bar{a}}) = \ldots = card({\varphi_n}^{M,x,\bar{a}})$

$\Leftrightarrow (|M|, {\varphi_1}^{M,x,\bar{a}}, \ldots, {\varphi_n}^{M,x,\bar{a}}) \in K_{TS}$,

$K_{TS} = \{(|M|, R_1, \ldots, R_n) : R_1, \ldots, R_n \subseteq |M| \wedge card(R_1) = \ldots = card(R_n)\}$

6. Quantifiers and computations

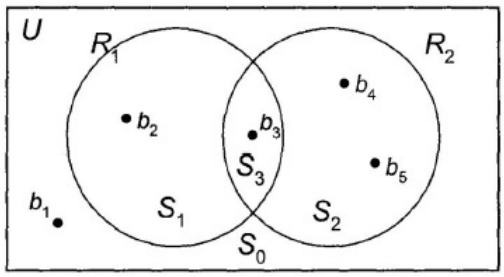
Class K_Q of finite tuples $\{M, R_1, \ldots, R_n\}$ can be represented by a non-empty set of words L_Q over alphabet $A = \{a_0, \ldots, a_{2^n-1}\}$ such that: $\alpha \in L_Q$ if and only if there exists $(U, R_1, \ldots, R_n) \in K_Q$ and a linear order on $U = \{b_1, \ldots, b_k\}$ such that: $lh(\alpha) = k$ and the i-th letter of α equals a_j exactly when $b_i \in S_1 \cap \ldots \cap S_n$, where:

$$S_l = \begin{cases} R_l & \& \textit{ if the integer part of } \frac{j}{2^{l-1}} \textit{ is an odd number} \\ U - R_l & \& \textit{ otherwise} \end{cases}$$

The $S_1 \cap \ldots \cap S_n$ intersections defined above are the constituents of a model, and letters $\{a_0, \ldots, a_{2^n-1}\}$ name these constituents. The above definition stipulates that the i-th letter of the string α equals $a_j$if and only if element b_i belongs to the j-th constituent. Thus, string α explicitly describes a model, i.e. encodes the information which elements belong to which constituents.

To illustrate this idea, let us consider model $M = (U, R_1, R_2)$, where $U = \{b_1, b_2, b_3, b_4, b_5\}$. The model will be represented by string $\alpha_M = a_0a_1a_3a_2a_2$ over the alphabet $A=\{a_0, a_1, a_2, a_3\}$, according to which element $b_1 \in S_1 = U - (R_1 \cup R_2)$, $b_2 \in S_2 = R_1 - R_2$, $b_3 \in S_4 = R_1 \cap R_2$, and $b_4, b_5 \in S_3 = R_2 - R_1$.

Figure 4. M = (U, R_1, R_2)



Now we can explain what it means that a given class of quantifiers is recognisable by a given class of automata.

Definition 4. *Let A be a class of automata and* ***Q*** *a class of monadic quantifiers.* ***A*** *accepts* ***Q*** *if and only if, for every monadic quantifier Q:*

($Q \in \mathbf{Q} \Leftrightarrow$ *there exists an automaton* $A \in \mathbf{A}$ (A accepts L_Q)).

With these definitions at hand, we can ask about the complexity of the procedures of identifying the truth values of sentences with quantifiers in finite models. The first scholar to answer this question was van Benthem (1986), who has shown, among others, that all quantifiers definable in first-order logic can be recognised by acyclic finite automata and that push-down automata accept the so called semi-linear quantifiers (definable in structure $(\omega, +)$) of type (1). The results of studies on computational semantics for monadic quantifiers were generalised and systematized by Mostowski (1998), in whose work we find the following theorem:

Theorem 3. *A monadic quantifier Q is definable in FO(D_ω)* $\Leftrightarrow$ *L_Q is accepted by a finite automaton.*

Not all quantifiers are represented by a regular set of words. Let us consider, for example, the quantifier "most", which is determined by the following class of models:

$K_{Most} = \{(|M|, R_1, R_2) : R_1, R_2 \subseteq |M| \wedge card(R_1 \cap R_2) > card(R_1 - R_2)\}$

In our example (cf. Figure 4), K_{Most} can be described as a context-free L_{Most}over alphabet $A = \{a_0, a_1, a_2, a_3\}$ in the following way:

$L_{Most} = \{\alpha \in A^*: n_{a_3}(\alpha) > n_{a_1}(\alpha)\}$.

In order to find the truth value of a sentence with the quantifier "most" in finite models, we need a push-down automaton which accepts language L_{Most}.

Van Benthem put forward a hypothesis that in order to describe computational semantics for natural language quantifiers it is enough to have machines with the power of push-down automata (van Benthem 1986). A counterexample can be found quite easily. It suffices to consider the quantifier *the same number of ... as ... and the same number of ...*. The following class describes this quantifier:

$K_{TS} = \{(|M|, R_1, R_2, R_3) : R_1, R_2, R_3 \subseteq |M| \wedge card(R_1) = card(R_2) = card(R_3)\}$

It corresponds to language L_{TS} over alphabet $A = \{a_0, \ldots, a_7\}$ such that:

$L_{TS} = \{\alpha \in A^*: n_{a_1}(\alpha) + n_{a_4}(\alpha) + n_{a_5}(\alpha) = n_{a_2}(\alpha) + n_{a_4}(\alpha) + n_{a_6}(\alpha) = n_{a_3}(\alpha) + n_{a_5}(\alpha) + n_{a_6}(\alpha)\}$.

Using the pumping lemma for context-free languages it can easily be observed that there exists no push-down automaton recognising language L_{TS}. This naturally negates van Bentham's hypothesis. It seems that it is very difficult to find any upper limit for computational complexity of natural language quantifiers. When using a language, we constantly learn to use more semantically complex constructions. Natural language includes not only expressions often used in colloquial speech, such as "some", "each", "a few", but also semantically sophisticated constructions used to practice science (cf. Mostowski and Szymanik 2012). Any possible limitations of the complexity of semantic constructions in natural language can be discovered as a result of research on the computational capacity of the human brain.

7. Comprehension of natural language quantifiers

The logical findings presented above allow us to formulate some hypotheses concerning the process of interpreting sentences with quantifiers in finite models by language users. We can suppose that the process of comprehending sentences with quantifiers in divisibility logic does not engage the human working memory, while comprehending sentences with quantifiers of more computational complexity requires using this memory.

Scientists have been developing methods of researching the neurophysio-

logical basis of language at least since 1861, when Paul Broca described a patient who had difficulties with speech production and whose brain after death was found to have the left hemisphere damaged. Soon after, Carl Wernicke examined a patient who had the left hemisphere damaged and difficulties with comprehending speech. These observations revealed the parts of the human brain responsible for speech production, i.e. the Broca's area, and for speech comprehension — Wernicke's area. Since then, there have been clinical observations on patients with brain injuries and language disorders, as well as other attempts to identify the neurophysiological basis of language.

Today, there are methods consisting in the visualisation of the undamaged areas of the cerebral cortex responsible for language. These non-invasive methods of neuroimaging include positron emission tomography (PET) and functional magnetic resonance imaging (fMRI). Both consist in measuring the changes in blood flow in the examined parts of a patient's brain while the patient is performing a cognitive task and in comparing them with the changes taking place during other tasks of similar kind. Blood flow in a given part of the brain is considered a proof that the part is active. Hence, measuring brain activity by neuroimaging requires at least two measurements to notice the difference in brain activity between two different cognitive tasks. Even though experimental tasks are adjusted on the basis of strong psychological premises, the interpretations of the results of neuroimaging methods should still be approached with caution (cf. Bookheimer 2002).

7.1. Neurological data

The first attempt to empirically test the implications of the computational theory by using neuroimaging methods was made by a research team from the University of Pennsylvania (McMillan, Clark, et al. 2005, McMillan, Clark, et al. 2002). In their research, they discuss two types of quantifiers: first-order quantifiers (e.g. *every*, *some*, *at least three*, *none*, *exactly two*) and higher-order quantifiers (e.g. *most*, *more than*, *an even number of*). The authors put forward the following hypotheses:

1. Comprehension of all quantifiers depends on the parts of human brain (cf. Dehaene 1997) that identify number properties.

2. Comprehension of higher-order quantifiers additionally requires the employment of working memory (cf. Baddeley 1986) that maintains numerosity properties during processing, and a mechanism that manipulates (compares) these numbers while they are retained in the working memory.

3. The difference between the computational complexity of first-order and higher-order quantifiers will also be reflected in differences in brain

activation during the processing of these quantifiers.

4. In particular, processing higher-order quantifiers depends on the activity of brain regions supporting working memory in a way that is essentially different from first-order quantifiers.

7.1.1. Research method

The researchers examined 12 adult Americans (8 men and 4 women). The subjects were presented for 10 seconds with a simple sentence involving quantification over a number of objects of a given colour (e.g. *At least three of the balls are blue*). Then, for 10 seconds, together with the sentence they were shown an image containing eight randomly selected objects (from the set: women, balls, flowers, cars, dinosaurs). The subjects were asked to answer the question whether the sentence accurately describes the situation shown to them. By using the fMRI method, the researchers observed which brain regions were activated during the processing of the task.

Six different quantifiers were presented, each in 20 trials: half were first-order quantifiers (*at least 3*, *all*, *some*) and half were higher-order quantifiers (*less than half*, *odd*, *even*). Half of the sentences were true.

7.1.2. Results

In the process of comprehending both first-order and higher-order quantifiers, the inferior parietal cortex associated with numerosity was activated. Only higher-order quantifiers activated the prefrontal cortex, associated with executive resources like working memory. Both types of quantifiers activated the right inferior parietal cortex, which suggests that numerosity contributes to the processing of quantifiers. Only higher-order quantifiers activated the right dorsolateral prefrontal cortex, which suggests the involvement of working memory in quantifier comprehension. These results confirm the hypotheses described above.

7.1.3. Discussion

The research described above was the first attempt to identify anatomic differences during the processing of quantifiers. It shows how important the concept of computational complexity is for the assessment of the difficulty level of a task and provides partial confirmation of the empirical correctness of the logical and linguistic model of quantifier comprehension. On the other hand, the research gives rise to many new questions and doubts. All of them require answers and explanations to be provided by new research. Below we present some of the problems.

Divisibility logic and higher-order quantifiers. Quantifiers such as *there exists an even (odd) number of* should not be included in the same group as the quantifier *most*. The former is definable in divisibility logic and

recognisable by finite automata. In other words, in order to compute the value of this quantifier, one does not need to refer to the mechanism that uses working memory. The quantifier *most*, on the other hand, is a typical example of a quantifier that requires using working memory to be understood. Thus, according to theoretical predictions, working memory should be activated only for those quantifiers that are not definable in divisibility logic. It seems important to conduct thorough research on the differences in processing quantifiers definable in first-order logic and in divisibility logic.

Quantifier complexity and the ordering of the universe. The difficulty of finding the truth value of a sentence depends also on the ordering of the elements of the universe. In the research described above, elements were generated at random, whereas by ordering a universe we can check the difference between the sentences that activate the working memory and those that do not. For example, to check whether the sentence *Most A are B* is true, we have to use working memory. If elements are ordered in pairs (a, b), where $a \in A$, $b \in B$, we can easily check the truth value of the sentence without using working memory. It suffices to verify whether there exists an element a not paired with any b.

8. Meaning as algorithm

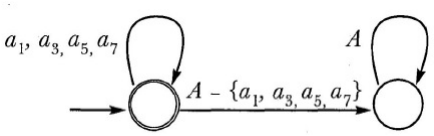
Below we will illustrate the idea of treating meaning as an algorithm by computing its truth value in a finite universe. First, let us consider the following sentences with monadic quantifiers:

1. *Every book in this library is green.*
2. *A certain book in this library is red.*
3. *At least two books in this library are blue.*
4. *Most books in this library are green.*

We can now describe their referential meaning (the algorithm for computing the truth value in a given universe) by using the concepts introduced earlier. Let us say that we are interested in the truth value of these sentences in world $W = (U, R_1, R_2, R_3)$ determined by a certain interpretation, where $U = \{b_1, \ldots, b_n\}$ — a universe consisting of the books of the given library, $R_i \subseteq U$ for $i = 1, \ldots, 3$, such that R_1 is the set of green books, R_2 is the set of red books and R_3 is the set of blue books. On input, the algorithm will receive the word α_W that describes model W up to isomorphism. We create the word α_W by choosing any order on the elements of the universe $U = \{b_1, \ldots, b_n\}$, and then we replace the i-th letter with the j-th letter of the alphabet $A = \{a_0, \ldots, a_7\}$ if and only if b_i is in the j-th constituent. The algorithm will accept α_W if and only if there is a true sentence in W the meaning of which is represented by this algorithm.

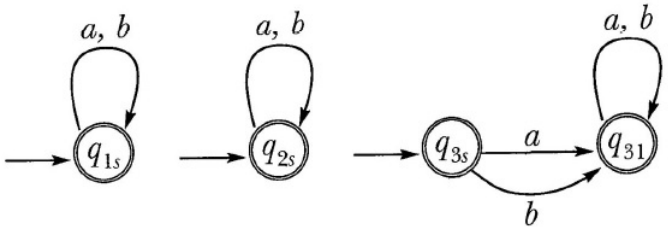
For the first three sentences, the relevant algorithms can be described by finite automata. The meaning of sentence (1) is the algorithm determining whether $\alpha_W \in L_\forall$.

Figure 5. FA accepting $L_\forall$



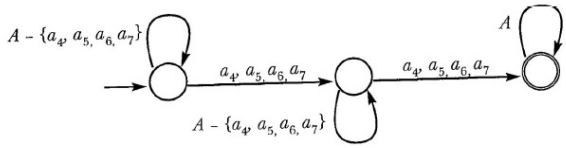
The meaning of sentence (2) is the automaton recognising language $L_\exists$.

Figure 6. FA accepting $L_\exists$



The meaning of sentence (3) can be described as follows:

Figure 7. FA accepting $L_{\exists>2}$,



In the description of the meaning of sentence (4) we use the push-down automaton $H = (A, \Sigma, \#, Q, q_s, F, \delta)$, where $A = \{a_0, a_1, \ldots, a_7\}$, $\Sigma = \{1\}$, $Q = \{q_1, q_2, q_3, q_a\}$, $F = \{q_a\}$, and the transition function is as follows:

— $(q_s, a_k, \#) \quad H \rightarrow (q_1, \#1)$ for $k = 1, 3, 5, 7$;
— $(q_s, a_i, \#) \quad H \rightarrow (q_2, 1)$ for $i = 0, 2, 4, 6$;
— $(q_1, a_k, 1) \quad H \rightarrow (q_1, 11)$ for $k = 1, 3, 5, 7$;
— $(q_1, a_i, 1) \quad H \rightarrow (q_1, \varepsilon)$ for $i = 0, 2, 4, 6$;
— $(q_1, a_i, \#) \quad H \rightarrow (q_2, \#1)$ for $i = 0, 2, 4, 6$;
— $(q_1, a_k, \#) \quad H \rightarrow (q_1, \#1)$ for $k = 1, 3, 5, 7$;
— $(q_1, \varepsilon, \#) \quad H \rightarrow (q_3, \#\varepsilon)$;
— $(q_1, \varepsilon, 1) \quad H \rightarrow (q_a, \varepsilon)$;
— $(q_2, a_i, 1) \quad H \rightarrow (q_2, 11)$ for $i = 0, 2, 4, 6$;

— $(q_2,\ a_k,\ 1)\quad H\ \rightarrow (q_2,\ \varepsilon)$ for $k = 1, 3, 5, 7$;
— $(q_2,\ a_k,\ \#)\quad H\ \rightarrow\ (q_1,\ \#1)$ for $k = 1, 3, 5, 7$;
— $(q_2,\ a_i,\ \#)\quad H\ \rightarrow\ (q_2,\ \#1)$ for $i = 0, 2, 4, 6$;
— $(q_2,\ \varepsilon,\ \#)\quad H\ \rightarrow\ (q_3,\ \varepsilon)$;
— $(q_2,\ \varepsilon,\ 1)\quad H\ \rightarrow (q_3,\ \varepsilon)$.

Naturally, as we have seen, there are sentences with a more complex referential meaning than context-free languages, e.g. sentences with the quantifier *the same number of*.

8.1. The criterion of identical meanings

We attribute various meanings to various sentences. One of the problems related to this is synonymy. When explaining the meaning of an algorithm for computing denotations, this problem takes the form of the question of when two algorithms can be considered identical (see e.g. Moschovakis 2001).

In other words, having a set A of algorithms, we search for such an equivalence relation $\approx$ on A that for every $f,\ g \in\ A$:

$f \approx\ g \Leftrightarrow f$ and g realise the same algorithm.

Thus, we say that algorithms f and g are identical ($f \cong\ g$), if and only if they stop for the same input data ($\forall\alpha \in\ \Sigma^*\ \{f\}(\alpha)\downarrow\ \Leftrightarrow \{g\}(\alpha)\downarrow$), giving the same result for identical arguments ($\forall\alpha \in\ \Sigma^*(\{f\}(\alpha)\downarrow\ \wedge \{f\}(\alpha) = \beta \Rightarrow \{g\}(\alpha) = \beta)$). Thus:

$(f \cong\ g) \Leftrightarrow \forall\alpha,\ \beta \in\ \Sigma[\{f\}(\alpha)\downarrow\ \Leftrightarrow \{g\}(\alpha)\downarrow\ \wedge \{f\}(\alpha)\downarrow\ \wedge \{f\}(\alpha) = \beta \Rightarrow \{g\}(\alpha) = \beta)]$.

This definition of identity is ineffective. For any two algorithms f and g, the problem "Does $f \cong\ g$?" is undecidable. We can solve it only in the simplest situation, when these algorithms can be identified with finite automata. Moreover, two algorithms identical in the above sense do not have to be equally good. For instance, if we take a sentence containing n words, it is possible that one algorithm will need n^2 steps to compute its referential meaning, while the other will need 2^{2n} steps. Thus, the identity definition should be extended by a condition saying that two meanings f and g are identical when $f \cong\ g$ and, in addition, f and g are comparable in terms of computational complexity (Mostowski and Wojtyniak 2004). Thus, $(f \approx\ g)$, if and only if $f \cong\ g$ and there exist polynomials $p(m,\ n)$, $q(m,\ n)$ such that for every word $\alpha \in\ \Sigma^*$ containing n elements, the following holds:

— if $\{f\}(\alpha)\downarrow$ after m steps, then $\{g\}(\alpha)\downarrow$ after $\leqslant\ p(m,\ n)$ steps;
— if $\{g\}(\alpha)\downarrow$ after m steps, then $\{f\}(\alpha)\downarrow$ after $\leqslant\ q(m,\ n)$ steps.

With this definition, we gain the entire hierarchy of meanings for every sentence, determined by the characteristics of algorithms corresponding to these meanings.

9. Conclusions

Here are some conclusions from the above:

1. The meaning of many expressions can be accurately described by identifying the procedures computing their denotations, in particular the truth value of sentences.

2. These procedures differ in terms of computational complexity for various classes of expressions. This is probably the reason why some sentences seem to us more difficult than others.

3. The meaning of an expression can be identified with the procedure for computing its extension in a finite universe. With such an extension, the problem of synonymy of expressions takes the form of a question about the identity of algorithms.

4. The computational model of quantifier meaning is partially confirmed by neurological data.

There are many other interesting and important issues related to the subject of this article, to which we have not provided any answers. They include, among others:

1. Adequate description of the semantics of linguistic expressions without the restriction to finite universes.

2. A description of the semantics of linguistic expressions other than quantifiers by using the computation theory.

3. A description of other possible methods of identifying the meaning of linguistic expressions (cf. Mostowski and Szymanik 2012)

4. A description of the possible procedures responsible for learning the semantics of linguistic expressions (Gierasimczuk 2005).

5. A detailed comparison of theoretical models with data from psychological and neurological research on the linguistic functions of the human brain.

These problems require a separate work based on interdisciplinary research with the use of data from such disciplines as: philosophy, computer science, linguistics, logic and neuropsychology.

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DEICTIC DEFINITION OF ABSTRACT NAMES

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The principal question posed by the present article is whether it is possible to name abstracts with the use of deictic definitions. The relevant literature (Czeżowski 1965, Przełęcki 1964) contains some suggestions of introducing the names of abstracts (abstract names) by means of deictic definition in its complex form (i.e. indirectly). What the author wishes to study is the possibility of introducing the names of abstracts (abstract names) through simple deictic definitions (i.e. directly).

It is perhaps advisable to begin with a terminological clarification. The terms "abstract," "abstract object," "abstract entity," "general entity," "generality," "universal," "universal object," "specie," "essence," "eidos" and "nature" shall be used interchangeably, as will "concrete," "concrete object," "concrete entity," "individuality" and "particular," (see: Marciszewski 1988: 213). In language names represents concepts. It should also be noted that the distinction between direct and indirect references is related to two different types of deictic definition:

"This $\downarrow$ is N" (simple form)

and

"This $\downarrow$ is $N \equiv \ \ldots$" (complex form).

In the latter model the sign of equivalence is followed by the basis for reference. Direct references are created by using a simple form of a deictic

definition, whereas indirect ones include the use of a complex form of the definition.

It is generally assumed that abstract entities cannot be experienced by means of the senses, in contrast with concrete entities. We may point to a concrete tree by saying "this beech," but it is impossible to do so e.g. in the case of a shape or a number — we specify them by referring to the shape of a concrete cup or the number of sweets in a given carton (Noonan 1976, Hale 1987, Hale 1998).

In keeping with this line of argument, the ability to describe a given object becomes the criterion of differentiation between concrete objects and abstract objects. In other words, if an object may be singled out not only with reference to its name, but also by using an indicative pronoun with an accompanying gesture, then the object is 'given' — present, and thus "concrete." This is why the names of concrete objects may be introduced into the language by means of deictic definition bearing the following form:

"This $\downarrow$ is N"

The symbol " $\downarrow$ " represents the gesture of pointing to the object, as well as all other actions used for identifying a concrete entity. Its usage shall also indicate that the object identified is, in the given situation, perceived by the senses of the speaker.

The phrase "This is N," in which the word "is" signifies identity was dubbed "statements of identity" by Dummett (1973). According to this criterion:

we cannot pick out abstract objects by ostension (Dummett 1973: 408).

In Dummett's view, abstract objects do not exist in space or time, which is why they cannot be perceived by the senses: seen, heard, tasted or smelled. Consequently, they cannot be pointed to in a deictic definition. It is therefore impossible to refer to abstract objects by ostension.

However, academic texts of philosophy and psychology offer frameworks within which general entities are directly subject to perception (e.g. Husserl, Fodor). If this be the case, then the distinction between concrete objects perceivable by the senses and abstract objects that cannot be perceived is not entirely accurate. If general entities are directly subject to perception, their names can be defined by deixis, in accordance with the rules of ostensive definition of concrete objects.

Philosophical texts tend to emphasise that creating a deictic definition causes causal links to emerge between the name and its designatum (designated object). Some scholars (e.g. Dummett 1973) claim that only concrete objects may form causal links. In other words, abstract objects cannot enter into such relations. Other researchers (e.g. Hale 1987) do not rule out the possibility of abstract objects entering into a kind of involuntary interaction with us. As Hale describes it:

> [...] identifying reference or thought about a particular object always requires a suitable causal link between the speaker/thinker (or their utterance/thought) and the object in question. (Hale 1998: 34)

It is perhaps justified to ask whether such relations of result exist between us and generalities. General entities certainly enter some kind of relation of cause and effect with us, or at least we are able to refer to them.

To conclude, we may make a preliminary assumption (or at least consider the possibility) that general entities may be available to perception and that we can refer to them in a direct way. Does literature provide ideas supporting such a thesis? We should bear in mind that there are conceptual frameworks claiming that deictic definitions may be used in introducing abstract names in an indirect way (Czeżowski 1965, Przełęcki 1964). This issue has been discussed elsewhere (Walentukiewicz 1988) and shall not be dealt with in the present publication.

1. DIRECT REFERENCE

Empirically speaking, there is a direct correlation between a perceptual term and its designatum, which can be perceived by the senses. This correlation is formed by deictic definitions, e.g. in the first act of christening a child (Kripke 1972). The scope of the perceptual term, in turn, is not directly defined – it is determined indirectly through similarity or on the basis of particular features of the objects within the scope (Kotarbińska 1966). It seems, however, that what we perceive through our senses is not, in fact, a direct experience. Psychological research has shown that our sensory data is highly theorised (Grabowska, Budohorska 1992).

The idea of a direct semantic link between language and the world are effectively put into practicen by phenomenology (experience may escape theorisation with the help of phenomenological reduction) and Fodor's conceptual framework (generalities direct "strike" the senses no prejudice). Could Husserl and Fodor accomplish what the empirics failed to achieve?

In accordance with their views, it may be said that there are at least two methods of arriving directly at general entities that may be used in deictic definitions: "the strike" or the phenomenological (eidetic) method.

Deictic definitions in their simple form are regarded as a method of linking what is directly given to us with its name. What is seems to suggest is that deictic definitions could function in a phenomenological conceptual framework and in Fodor's concepts. The need to investigate this possibility from a phenomenological point of view has already been suggested by Kotarbińska in her work *Tak zwana definicja deiktyczna* (Kotarbińska 1966). In her opinion, ostensive definitions may work well not only on an empirical, but also on a phenomenological basis. Although deictic definition has hitherto been mentioned only in relation to concrete entities and phenomenology speaks of direct perception of general entities, we shall try to establish whether it is possible to use a deictic definition to define the reference of an abstract names. What is important here is the element of directness that deictic definition ought to establish between language and the world. Objects perceived are presented to us directly. Perception constitutes the common ground for deictic definitions and the conceptual framework of Fodor and Husserl. This is where we shall begin.

It is commonly believed that perception allows us to know particulars. According to some scholars, perception presents us with concrete features, relations or facts of the world (see: Walentukiewicz 1988, 1998). Phenomenologists and Fodor go a step further and assume that through perception we are able to reach generalities, and essences (*eidos*). What they mean is that we are able to perceive universals:

> [...] knowledge [...] can not only bring particulars, but also universals, universal objects [...] to absolute self-givenness. (Husserl 1999: 39)

However, the phenomenologists' understanding of the term 'perception' is somewhat different from its usual definition.

Phenomenologists define perception as every experience or feeling in which something is present, given in a direct way (McKenna 1997: 517). Such an idea of 'perception' incorporates what we perceive through the senses. Fodor, in turn, speaks mostly of sensory perception.

In Husserl's view, perceptual experiences occur on two levels: on the first level, they inform us of the spatio-temporal world which is already given and ready to be received; on the second level, awareness reaches beings in a situation where the world of experience is constructed (McKenna 1997: 519).

Sensory perception or creating an image is the first step towards perceiving universal. However, the most important aspect is:

[. . .] what can be directly seen and apprehended. (Husserl 1999: 28)

What is the simplest way for generalities to be presented to us? The answer seems to lie within Fodor's conceptual framework. In his opinion, general entities "strike" us, "strike" our sensory organs without any intellectual effort on our part. We are simply exposed to such "strikes." Let us now turn to this idea.

2. THE NOTION OF "STRIKE" AS DEFINED BY FODOR

Fodor's conceptual framework was named *Informational Atomism*, usually abbreviated to IA. It is composed of two parts: informational semantics and conceptual atomism. The former makes the assumption that the emergence of a given concept is based, at least partly, on the nomic relation between the mind and the world. Conceptual atomism postulates that some concepts, which Fodor dubs "conceptual primitives," are atomic, i.e. they have no internal structure (Fodor 1998: 121).

According to Fodor, there is something that gives a concept its essence. This "something" may either be complex or simple. In the former case, the concept in question may be defined. Fodor's examples for such concepts are GREEN and DOORKNOB. There is something that makes a doorknob be what it is. This something is either simple or complex. If it was complex, the concept of a doorknob would have to have a definition. So far, no such definition has been given (at least Fodor claims he was not able to find it).

Fodor calls such concepts (mental states) "primitives" and claims they are directly linked to certain elements of the world (Fodor 1998). How does such a connection emerge?

Other scholars dealing with concepts are of the opinion that developing a concept is tantamount to gaining certain knowledge (of relevant features or of the prototype, level and scope of similarity; of atypical examples or of the theories organizing a concept). Fodor, in turn, decides that arriving at a concept

[. . .] is (not knowing something but) being in a certain nomic mind-world relation; specifically, it's being in that mind-world relation in virtue of which the concept has the content that it does. (Fodor 1998: 124)

Fodor believes that acquiring a concept

> is getting 'nomologically locked' to the property that the concept expresses. [...] concept possession is some kind of locking [...]. (Fodor 1998: 125)

Fodor presents his concepts as a typical causal model and claims that concepts are not learned but "caught, sort of like the flu" (Fodor 1998: 128). We possess a certain type of mind, which is susceptible to being "struck" by any entities, such as — to paraphrase Fodor's comparison — our bodies are susceptible to flu. Because our minds work like they do, we can develop concepts such as DOORKNOB or GREEN (Fodor 1998).

If my understanding of Fodor's atomistic conceptual framework is correct, the nomological link he mentions is the direct relation between a concept and an abstract entity (e.g. green-ness).

Our mind doesn't forms a causal link between concrete shade of green and the concept GREEN but between generality of green (green-ness), that is in all concrete greens, and the concept GREEN (see also: Rey 1998: 514):

> It does not follow either that there are perceptual 'criteria' for 'doghood' or that, if there are, these criteria are constitutive of the content of the concept DOG. What's metaphysically pertinent to the 'content' of DOG is the same things that's metaphysically pertinent to your 'possession' of DOG; namely, that it's 'doghood' (and not, as it might be, 'cathood') [...]. (Fodor 1998: 77)

Thus, the acquisition of primitive concepts consists in grasping the relation between the content of the concept and the experience that elicits it (see: Fodor 1998: 130).

What conclusions can be drawn from Fodor's insights? Firstly, grasping a given attribute is possible because objects do possess certain attributes. Secondly, the human mind is sensitive to being "struck" by certain properties. Thirdly, the innate abilities needed to grasp concepts such as "green" or "greenness" consist of specific mechanisms due to which green objects "strike" us as they do (see: Fodor 1998: 140). The innateness pertains not to concepts, but to the mechanism (Fodor 1998: 140). Fourthly, Fodor mentions colours as the best examples as entities that "strike" us — the names of such properties are most commonly mentioned as examples of concepts defined by deixis. Fifthly, Fodor also agrees that the relation between a sensory concept and its cause is not arbitrary, as the notion of RED is acquired by perceiving something red, and not green (see: Fodor 1998: 130, 131). Certain

experience allows us to acquire a concept — such a thesis is accepted by empiricists, phenomenologists and by Fodor himself. What they disagree on is whether these concepts are abstracted from experience or directly caused (occasioned) by experience (Fodor 1998: 127).

Fodor offers the following summary for his deliberations:

So, here's the riddle. How could 'doorknob' be undefinable (contrast 'bachelor' =df 'unmarried man') and lack a hidden essence (contrast water = H_2O) without being metaphysically primitive (contrast spin, charm and charge)? The answer (I think) is that 'doorknob' works like 'red'. (Fodor 1998: 135)

2.1. DEICTIC DEFINITION IN FODOR'S CONCEPTUAL FRAMEWORK

It may be argued that the links between generalities and their names may constitute ostension. Firstly, there is a connection between e.g. "dog-ness" and someone's mental state or, to put this another way, the human mind is able to react to "dog-ness" (Fodor 1998: 76). Secondly, a visual perception is able to establish a relation between the concept DOG and dog-ness (Fodor 1998: 76). We decide that something is a dog on the basis of aural and visual perceptions. It does not mean that there are certain perceptual criteria of dog-ness, and even if this was the case, these criteria would not constitute the content of the concept DOG. The concept DOG is determined by dog-ness, and not by cat-ness. Being a dog or green is all that is needed to grasp the concept of DOG or GREEN. Thirdly, if someone grasps what is dog-ness or green-ness he/she may then give appropriate names to these concepts, using ostensive definitions. If in language names represents concepts, then the name 'dog' designate dog-ness or being a dog (Fodor 1998: 77, 127). Fourthly, Fodor's model example of how red-ness "strikes" us, pertains to a certain property, and therefore is best described with the help of a deictic definition. Lastly, Fodor mentions a link between general entities and their linguistic symbols, which may be acquired by ostension:

Presumably, one could acquire REDSQUARE ostensively. That is, one could get locked to 'being a red square' (not by first getting locked to 'being red' and 'being square', but) by learning that redsquares (sic) are the things that look like 'those'. (Fodor 1998: 164)

Fodor confirmed this assumption in an internet conversation on 14th May 2002. When asked whether the concepts he mentioned in his work *Concepts* can enter language by means of deictic definition, he replied:

> On my view, what gives a concept content is some sort of causal relation between its instances and things in the world. I see no reason why ostensive definition might not be sufficient to establish such connections 'de facto'. (filozofia.pl — cz@t)

Many concepts must be learnt — i.e. they are not innate. Moreover, concepts are public property; they may be shared by many individuals.

> It seems pretty clear that all sorts of concepts (for example, DOG, FATHER, TRIANGLE, HOUSE, TREE, AND, RED, and, surely, lots of others) are ones that all sorts of people, under all sorts of circumstances, have had and continue to have. A theory of concepts should set the conditions for concept possession in such a way as not to violate this intuition [...] it should turn out that people who live in very different cultures and/or at very different times (me and Aristotle, for example) both have the concept FOOD; and that people who are possessed of very different amounts of mathematical sophistication (me and Einstein, for example) both have the concept TRIANGLE; and that people who have had very different kinds of learning experiences (me and Helen Keller, for example) both have the concept TREE; and that people with very different amounts of knowledge (me and a four-year-old, for example) both have the concept HOUSE. And so forth. Accordingly, if a theory or an experimental procedure distinguishes between my concept DOG and Aristotle's, or between my concept TRIANGLE and Einstein's, or between my concept TREE and Helen Keller's, etc. that is a very strong [...] reason to doubt that the theory has got it right about concept individuation [...]. (Fodor 1998: 29)

Furthermore, primitive concepts do not possess internal structure, and thus they cannot be analysed — there is no such thing as conceptual analysis. "And what on earth are conceptual analyses *for*" asks Fodor (1998: 122).

Seeing factual dogs allows dog-ness to "strike" our senses, thus creating the concept of DOG. The semantic relation between a concept and a general entity is forged on the basis of perception. Experiencing an example of a dog results in the emergence of a causal link between dogs and their mental representations, or, strictly speaking, between the feature of dog-ness that "strikes" our senses because they work as they do, and the mental representation.

A deictic definition based on this conceptual framework would consist in determining the causal link between the name and the general entity that creates the concept by "striking" the senses.

In their empirical version, deictic definitions are attempts at answering the following question:

> What is it that the things we take to be Xs have in common, 'over and above our taking them to be Xs'? (Fodor 1998: 135)

Fodor, however, claims the following: we take Xs for Xs, and the common features of all Xs are of no importance whatsoever. A deictic definition — "This is *X*" — connects the general entity directly with the concept of X, which is represented by the name "X" in a given language. General entity that "strikes" our mind is designatum of name "X" or the concept X. Thus, deictic definitions would introduce primitive concepts into the language, e.g. notions such as GREEN, DOORKNOB or DOG. Such are Fodor's views on the issue.

3. HUSSERL. THE WAY OF ELICITING ESSENCE. EIDETIC METHOD.

For phenomenologists, the nature of concepts is not elicited by being "struck" but by the eidetic method, also referred to as the "a priori method," "the method for eliciting essence" or as "the method of determining universal and necessary knowledge" (Scanlon 1997).

Husserl describes the method in the following manner:

> Let us consider cases where the universal is given, that is, cases where a purely immanent cosciousness of universality constitutes itself on the basis of a seen and self-given paticularity. I have a particular intuition of red, or several particular intuitions of red; I attend to pure immanence alone; I perform the phenomenological reduction. I separate off anything that red might signify that may lead one to apperceive it as transcendent, as, say, the red of a piece of blotting paper on my desk, and the like. And now I actualize in pure seeing the sense of the thought red, red 'in specie', the IDENTICAL UNIVERSAL that is seen in this or that; now the particularity as such is no longer meant, but rather red in general [...] We see it — there it is; there is what we mean, this species red. (Husserl 1999: 42)

The first step towards *eidos* is having an empirical experience or a representation. If, for example, we are trying to arrive at the essence of green, we may use examples known to us from empirical experience or conceive

an imaginary example, e.g. a green extra-terrestrial. We then need to apply phenomenological reduction, which means that:

> [...] we may not take over anything from the sphere of pre-scientific knowledge. All knowledge bears the index of dubitability. (Husserl 1999: 26)

Phenomenological reduction extricates the example in question from all contexts, e.g. the time and place of its occurrence and causal links with other objects (Scanlon 1997).

Eidetic knowledge may be divided into two types: the act of ideation, also called "idea-generating abstraction," and the imaginative variation (in Ingarden's terms — *uzmiennianie*), also called "generalising abstraction." The act of ideation consists in focusing on a single chosen feature, isolating a property on the backdrop of the entire object while disregarding the remaining elements of the experience (Widomski 1985). What is required next is a change of attitude, a shift from naturalism or empirism (which are focused on the concrete) towards an eidetic approach (which means focusing on what is general and relevant). In such a case, it is not a particular example of a phenomenon (e.g. the shade of a colour) that becomes known, but the colour as a "species" (Stępień 1995). We arrive at an unwavering conviction that this property exists as a species (Ingarden 1974).

Imaginative variation, in turn, is conducted on figments of the mind and is therefore independent of the source, e g. from perception (Widomski 1985). Ingarden claims, however, that deriving concepts from imaginary objects alone may lead to errors in the process of variation, which may be corrected by referring to experience (Ingarden 1971).

The act of imaginative variation consists in determining a "qualitative specifity" (Stępień 1995), in realising that green-ness is a feature of extensive objects, that it may come in different shades and that it is analysed in relation with other qualities:

> [...] we express the necessities [...] green-ness [...] is subject to and the possibilities it allows. (Stępień 1995: 30)

With the help of the eidetic method, we are able to perceive the essence. This insight is

> a single act of the subject, reaching what is universal and indispensible [...]. (Widomski 1985: 49)

The insight reaches "[...] what determines its identity [...]" and may be called the "what" (*Was*) of the object (Widomski 1985: 49).

Perceiving the essence of a given object is an act of direct cognition. Should the eidetic method be used with a different initial example, it would lead to the same essence.

Husserl's conceptual framework is based on the following:

1. The essence is available to us through perception, through pure seeing;
2. The essence is universal, identical for all specific examples of a given species;
3. To reach the essence, one ought to begin with particular, concrete objects (this view was shared by Husserl, Czeżowski and the empirists);
4. The essence is reached by employing the eidetic method and phenomenological reduction;
5. Reaching the essence is not tantamount to abstraction in the psychological sense;
6. Reaching the essence provides a clear understanding of what a given essence is and thus, it seems, provides the names designating the essences with an unambiguous meaning and reference;
7. Reaching the essence ensures the accuracy of cognition;
8. Phenomenological analysis is performed *a priori* and "carries out its clarifications in acts of [...] pure seeing" (Husserl 1999: 43).

Can such a method be applied to form deictic definitions? Can essences defined in such a way be named in the process of ostensive definition? At a glance, it seems that there are no contraindications for giving a name to the essence of a colour. There are also no contraindications for using deictic definition as the means for linking what is directly perceived with its name. To do this, one would only have e.g. to point to green objects and employ the eidetic method to directly isolate the essence and name it "green-ness." In contrast with the empirical version of deictic definition, what is named here is the abstract - "green-ness" and not a concrete example of the colour green. Let us try to justify this thesis.

3.1. THE NATURE OF DEICTIC DEFINITION OF DIRECTLY PRESENTED ABSTRACTS

First of all, it must be noted that Husserl does not mention deictic definition in his work. It may be argued, however, that in his framework ostensive definitions could determine the denotation of names, which in turn refer to essences.

Both Husserl and Fodor assume that what is universal, i.e. that what is directly given and framed in the act of intuition or that what is instantaneously imposed upon us, may be preserved through forming concepts or through naming. We can:

> [...] formulate what is beheld in faithful conceptual expressions which allow their sense to be prescribed purely by what is beheld or generally seen [...]. (Husserl 1983: 150)

In phenomenology:

> [...] we perform acts of seeing essences immediately in given examples of transcendentally pure consciousness and fix them 'conceptually' and terminologically. The words used may derive from the common language; they may be ambiguous and their changing senses may be vague. As soon as they "coincide" with the intuitionally given in the manner characteristic of an actual expression, take on a definite sense as their actually present and clear sense, 'hic et nunc'; and starting from there we can fix them scientifically. (Husserl 1983: 151–152)

In order to define deictically essences, we must reach them — and they will be directly available to us. A deictic definition such as "This $\downarrow$ is N" is sufficient for the purpose, although some effort towards a "purification" of the mind is required before the definition may be used in this form.

The use of deictic definition which utilises eidetic method may be demonstrated with the example of geometry. To explain the concept of a square or a circle we usually draw a specimen of the given shape, adding that these are not squares or circles *per se*, but merely imperfect examples. The person whom we are trying to acquaint with the concept must then employ phenomenological reduction, i.e. discard all theoretical prejudices and all common knowledge of circles. Then, they must alter their attitude, moving from a naturalistic approach, focused e.g. on the colour of the circle drawn, the type of material used, the thickness of the line, towards an approach that would aim at understanding the form or species of a square or a circle. The lines that (imperfectly) form the shape of a square or a circle are of no importance compared to the essence that determines what is a square and what is not. It should be determined therefore what is crucial for a circle to be a circle. This determination occurs as a mental process and aims at isolating the essence, reaching the *eidos* — the essence of a circle or a square. We use the word "this" not to single out a particular object, but to identify

its essence as "this."

Examples of circles or squares available to students by means of sensory perception in the process of presenting a deictic definition of abstract names are not used to turn their attention towards concrete objects or to point to what constitutes the essence (the basis for using a term), but to steer towards the essence that is, according to Husserl, given in eidetic perception.

There are, however, some reservations. First of all, the presented examples of the objects must have the right essence. Although it is concrete objects that are pointed to, the aim of the exercise is demonstrating the essence. In the empirical version of deictic definitions pointing to a concrete object is an end in itself, or is done in order to demonstrate common perceptual features. From the point of view of phenomenology, the attitude of the perceiving individual and their intentions are different. Secondly, in the phenomenological model a vital role is played by phenomenological reduction. From an empirical point of view context is crucial in describing the reference of the word "this," but in a phenomenological approach context may even be regarded as harmful. We ought to shut the door behind our theoretical prejudices before engaging in phenomenological research. It does not imply that in this model of deictic definitions it is possible to entirely disregard context. To the contrary, it ought to be treated with particular attention, so that the researcher may consciously cast it aside. The rejection of the context must be overt. Bearing these reservations in mind, the following model for deictic definition within the phenomenological framework may be presented as:

When you disregard context C using the phenomenological method, you are given, directly and perceptibly, the pure essence E, which is pointed to by means of the word "this" and a gesture, and which is associated with the name "N."

The object of this definition is to be given to us as "that" (Husserl 1999: 29). The word "that," accompanied by a gesture or, precisely speaking, an intention, turns the attention towards the general entity and is used without the context, e.g. neither a verbal, nor a situational context is needed to determine designatum. The word "this" does not carry any meaning and therefore provides a clear reference to the generality, free of any theoretical prejudice.

In order to emphasise this particular intention with which universals are referred to, the author of the present article proposes to use the symbol "{...}." If the aim of the definition is to establish the essence, the pronoun

"this" shall be put in curly brackets — "{this}." This shall mean that the person who defines an object uses the pronoun "this" and a gesture to point to the essence of a given object. Thus, the model for deictic definition would take the following form:

When you disregard context C using the phenomenological method, you are given, directly and perceptibly, the pure essence E, which is pointed to by means of the expression "{this}" and a gesture, and which is associated with the name "N."

Wishing to define deictic the essence of green — the green-ness — we ought to begin with pointing to a shade of green and using the phrase "This ↓ is green" (then students with an empirical approach shall be given a shade of green). At this point the receivers of the definition should employ eidetic method, which will allow them to arrive at pure green. The name "N" shall then refer not to the particular shade of the colour green, but to the universal, the green-ness. The model of deictic definition then takes the following form:

"{This ↓ } is *N*,"

where the phrasing "{This ↓ }" implies that the definition pertains to the essence. If the defining individual does not aim at isolating the essence, the definition takes a simpler form:

"This ↓ is *N*."

The phenomenological model of deictic definitions has the following characterictics:

1. We show only positive examples of reference that will best serve the purpose of pointing to the essence:

consequently there is a need to bring the exemplificatory single particulars nearer or to provide anew more suitable ones in which the confusedly and obscurely single traits intended to stand out and, consequently, can become given with maximum clarity. (Husserl 1983: 157)

The direct and intuitive acquisition of an essence may be achieved

on the ground of a *mere presentation* of exemplificative single particulars. (Husserl

1983: 158)

2. We employ eidetic method.

3. We forge a direct link between the name and its — the essence, important in every possible universe.

4. Concrete examples are sufficient for determining the most general differences between essences.

5. We guarantee the non-ambiguous of the names.

3.2. ANALYTIC NATURE

Phenomenology may also provide the means to explain the problem of the analytical nature of deictic definitions, an issue mentioned by Austin (1993). If it is possible to define by deixis names that pertain to the essence, then not only the examples or the (proto)types would be presented, but also the links between them, would be readily perceivable. Thus, the eidetic method may be used e.g. in an act of christening — we would then realise that the name "A" defined by deixis is not equivalent to the defined name "B." If "this is the taste of an apple" and "this is the taste of a pear," then the taste of an apple cannot possibly be equivalent to the taste of a pear. In other words, if "This ↓ is A" and "This ↓ is B" pertain to different essences or general entities, the implication is that A is not identical to B. This conclusion is made on the basis of eidetic perception.

> The insight that of two different tones, one is lower and the other is higher, and that this relation is not reversible, constitutes itself in the act of seeing. (Husserl 1999: 50)

The intuited essence may be compared to other essences. Thus, we are able to grasp such connections as: green is a colour, blue is not green, blue is a colour, sounds are not colours, colour is a perceivable quality, sound is a perceivable quality, etc.

In the case of the phenomenological model of ostensive definition, two necessary qualities may be distinguished: necessary semantic links between names and their designated objects and necessary links between the essences conveyed by means of the following form of deictic definition:

"{This ↓ } is A, and {this ↓ } is not A, but B."

4. SUMMARY

To conclude, the notion of deictic definitions propagated by Johnson (1921), in the opinion of the author of the present article, finds its fullest realisation within the framework of phenomenology and Fodor's concepts, as well as within the theoretical background presented in Wittgenstein's *Tractatus*, although this last work lies outside the scope of the present research (Walentukiewicz 1998). The designated entities of abstract names defined by deixis are constant, unchanging entities that in necessary mode are linked with the names that designate them. This connection is valid in every possible universe. The essences become points of reference for categorization. Cognition of universals is necessary for the proper use of names and allows us to create eidetic conceptualisations, which are important in many aspects of life, practical and otherwise (Scanlon 1997). Only by reaching to the essence are we able to see that common linguistic knowledge and usual reference do not always reflect the exact eidetic conceptualisation.

If the essences have been recognized once, they need not be re-extracted. The efficiency of deictic definitions depends on the individual and corresponds to his or her level of proficiency in employing the phenomenological method of reaching to the essence. This is why assessing the effectiveness of such a definition is less important than ensuring that the phenomenological method is employed in a proper fashion, which — as Husserl indicates — requires substantial practice (Husserl 1983).

Such problems are not discussed in Fodor's work. According to him, we are able to use deictic definition whenever a general entity "strikes" the student. In such cases, it is sufficient to use a simple ostensive definition with the following form:

"{This ↓ } (which "strikes") is *N*."

Husserl, however, notices a problem. While seeing a house, we may have not only the eidos of a house, but also the eidos of red and the eidos of spatial arrangement. If someone points to a house in an act of deictic definition, how are we to determine, to which general entity name is referring (Husserl 1999)? Fodor mentions a similar dilemma: how does it happen that, when shown a dog, we acquire the concept of DOG, and not EARS, EYES or CLAWS OF A DOG? It seems that the result depends on the intention of the defining individual. The person for whose benefit the definition is presented must, unfortunately, be able to grasp this intention, which is hidden. It is perhaps justified to ask whether deixis is the best means for defining such concepts.

5. CONCLUSIONS

Is it possible to refer to general entities (abstracts) directly? According to Husserl and Fodor, it is. If they are right, abstracts can be named by means of ostensive definitions. Deictic definitions of the names directly denoting abstracts would in this case take the following form:

"{This ↓ } is *N*,"

which is the simple model of deictic definition. The links created would be valid in every possible universe. The names thus defined would become fixed designators, as they would designate constant, unchanging essences. Deictic definition of abstract entities would therefore be very similar to the model of deictic definition in logical version, in the version presented by Wittgenstein in his *Tractatus* (Walentukiewicz 1998). However, there are some differences that ought not to be disregarded. The most important dissimilarity lies in the method of extracting unchanging essences. In Wittgenstein's view, they are to be isolated by means of logical analysis, Husserl favours the eidetic method, whereas Fodor claims that these essences simply "strike" our senses.

As to the difference between direct and indirect deictic definitions of abstract entities, it may be argued that in the first case the gesture is intended to point directly to the abstract, while in the second it is the concrete object that is being pointed to. Husserl and Fodor employ epistemological methods to arrive directly at general entities, whereas Przełęcki and Czeżowski use the semantic method to present the principle of applying a name to their designated objects.

The most important notion that may be inferred from the present article is that since it is possible to ostensively define the names of abstract entities, ostension is not a criterion differentiating abstract from concrete objects.

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THE BASIC CONCEPTS OF FREGEAN SEMANTICS. FREGE AS THE FATHER OF THE CONTEMPORARY PHILOSOPHY OF LANGUAGE

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Gottlob Frege is not only the father of contemporary mathematical logic and the philosophy of logic, but — as advocated by others, especially M. Dummett (1973) – he is, above all, the founder of contemporary research in logic and the philosophy of language. The categories and concepts introduced by Frege were assimilated by philosophers studying language and inspired further detailed analyses. It seems impossible to overestimate the role of Frege's theory, despite the fact that his objectives — setting a logical basis for mathematics, undoing the psychologizing of logic, building a clear and accurate language for logic and science — differ from the ones set out by contemporary explorers of language.

In this article I will discuss the fundamental categories of Frege's semantics, such as: truth, sense (*Sinn*), thought (*Gedanke*) and meaning (*Bedeutung*) in the context of mutual connections between them. Also, I indicate in what way Fregean analyses concern mostly thoughts and their objective, and the non-epistemic character inspired contemporary research on language, including such research that concerns language use and its epistemic entanglement.

It is not difficult to observe that Frege's distinction between *Sinn* and *Bedeutung* allowed logical semantics to develop and distinguish intensional from extensional contexts. It was Frege who introduced and argued for the

"principle of compositionality" which is valid in the philosophy of language till today. He also takes credit for differentiating ontological order (the relation of an object's falling under a concept) from semantic order (labeling an object with a name). The specificity of Frege's approach lies in three-leveled semantics in which labeling is not simply a two-argument relation, but requires a third element, i.e. sense (*Sinn*) which will be discussed later in the article. Logic, as understood by Frege, was assigned the task of discovering rules governing truth-values, and, similarly, a true cognition was supposed to be the unquestionable aim of science. In this sense, scientific work consists of discovering true thoughts, and not in creating them. This involved developing a theory which places emphasis not only on the objectivity of a thought when indicating its content, but also its fundamental bond with language. Frege did it by defining the thought (*Gedanke*) as the sense (*Sinn*) of a sentence, and by introducing a specifically understood concept of reference (*Bedeutung*), which resulted in a permanent connection between the categories of truth and meaning. In this way, in semantics and, more broadly, in philosophy, traditional considerations about the concept of meaning were replaced by considerations about *Sinn* and *Bedeutung*, and supplemented by the categories of force (*Kraft*) and tone (*Färbung*).

Truth, in a specific connection with meaning, is an important category which impinges on all analyses of Frege's works. It is inevitable to add here that, from the very outset, Frege rejects a subjective understanding of truth present in colloquial language, such as in the expressions: "truthful," "truth loving," "true masterpiece," "true feeling." Also from the outset, that is from the book *Die Grundlagen der Arithmetik* from 1884, he postulates the following principle in analysing certain issues, the principle which was to become not only a leading idea for logic, but also an important hint for philosophical research on meaning: it is necessary "to separate sharply the psychological from the logical, the subjective from the objective" (Frege 1980: Introduction: X).

Frege rejects classical philosophical definitions of truth, beginning with the correspondence theory of truth. For truth, according to Frege, is something specific (time-free, eternal, non-relative, unchangeable) and certainly basic to such an extent that it is indefinable and unreducible to anything simpler.[1]

[1]Cf. Frege's considerations about the fallacy of any theory of truth (Frege 1918). The thesis of the indefinability of truth has also been accepted by Davidson. Following Dummett, it is possible to claim that the Fregean thesis of the indefinability of truth has a special reading because the indefinability does not concern a primitive truth un-

There is tension in understanding the category of truth in Frege's works. On the one hand, the predicate of truth is redundant and does not correspond to real properties or relations in the world. On the other hand, Frege highlights that truth is privileged and that it is the aim of logic and science in general. Is the privileged position which Frege assigns to truth justified? For when it appears as the predicate in sentences or propositions (which surely participate in building science), it is, from the point of view of logic, something redundant... Frege claims that truth is neither a relation nor a property; but it does not mean that it is nothing. It is an object of a specific type, an abstract object. There can be found no analogy in the relation truth — thought, and the relation subject — predicate in a sentence. It needs to be pointed out that, in Frege, truth has two basic senses whose differentiation is crucial to understanding his theory. Firstly, it has an ontological sense when Frege claims that the *Bedeutung* of a sentence is Truth. Secondly, it has a semantic sense when it appears as the predicate "is true" with a reference to a thought expressed in a particular sentence (Łagosz 2000: 8). What raises doubts, however, concerns the relation between the two senses — what is the relationship between Truth as an object and the redundant predicate of truth? To some extent it is possible to show that they belong to different categories. Truth as an object that belongs to ontology in such a sense in which the meaning (*Bedeutung*) of p in "it is true that p" is Truth, while the predicate understood by Frege as a functional expression belongs to linguistic categories. The ontology created by Frege should be rather regarded as a description of a logical universe, and not as a theory about something existing in reality. In this interpretation, what is linguistic will always be something secondary towards what is ontological.[2]

If we represented Frege's referential semantics as three levels, the category of sense (*Sinn*) would be placed between the object (which constitutes the *Bedeutung* of a name) and the sign (*Zeichen*, *Name*); and the schema may be applied not only to signs that are names but also to predicative or sentential expressions (Żegleń 1993: 56). I will return to the latter later in the article. Surely, it can be claimed that *Sinn* is not the object itself

derstood as a predicate expressed in Frege's formal language, but only concerns a truth understood in a secondary sense as a predicate asserted about sentences (Dummett 1993: 129; Dummett 1973: 442-470).

[2]For a philosopher focused more on epistemology and issues of recognizing a truth-value of individual sentences as referring to the real world; the above Fregean understanding of truth may be troublesome and insufficient. It is not an objection to Frege's theory, at least as in how far we take into consideration the fact that the initial objective of his research was different than that of a contemporary epistemicist.

and is not subjective in character. Frege highlights that it is not what, in philosophical tradition, is called representation (*Vorstellung*), it is not a form of mental act with a purely subjective character. In his famous example about observing the moon through a telescope, Frege indicates a certain analogy. Here we need to deal with three aspects of this observation: firstly, there is the moon which we observe (the object), secondly, we see the image of this object in the telescope, thirdly, we have the name "moon" (sign) which we use to refer to the object. The status of *Sinn* in the above example has been illustrated as the image of the moon in the telescope. While talking about the moon, we certainly do not want to talk about the moon's representation, about the subjective image of the one who observes this object through the telescope; also we do not want to talk about the image of the moon (*Sinn*) available for many observers, in the telescope. We assume rather that the name "moon" has its own reference, its own object (*Bedeutung*) (a real and independently existing moon), which is given through the image of the moon in the telescope (*Sinn*).[3] Frege comments on this in a famous quote: "a proper name (word, sign, combination of signs, expression) expresses its sense, stands for or designates its reference. By employing a sign we express its sense and designate its reference" (Frege 1997: 156).

One of Frege's most important articles devoted to the philosophy of language is the famous *Über Sinn und Bedeutung* from 1892, an article from Frege's late period.[4] In this work the author begins his analyses with examining the category of identity, by considering differences between the following formulas: "$a = a$" and "$a = b$." The former formula expresses, let's say, a normal identity, while the latter states that "a is the same as b," or "a overlaps with b." It is evident, however, that the formulas differ from each other, and are not applied for the same purpose. They differ from each other, writes Frege, with respect to their cognitive value. This cognitive

[3]This analogy, however, should be understood metaphorically as there is no postulate that *Sinn* is a kind of image.

[4]A translation of the title itself caused a great deal of trouble. In the Polish language there are two versions. In J. Pelc's translation *Znaczenie i nominat* [*Meaning and nominatum*] (Frege 1967: 225-248) and in B. Wolniewicz's translation *Sens i znaczenie* [*Sense and meaning*] (Frege 1977: 60-88). In the British tradition, there are at least two versions; one *On sense and Nominatum* in H. Feigl's translation from 1949, the other *On sense and Reference* in M. Black's translation from 1952. One of the philosophers responsible for misunderstanding the category of *Bedeutung* is Bertrand Russell himself, who translated *Sinn* as *meaning* in his text *On Denoting* (Martinich, Sosa (red.) 2001: 34). Some authors think that translating *Bedeutung* as *reference* is incorrect and results in misunderstanding the theory of Frege (cf. Łagosz 2000).

value is simply different for each of the two. What is it, then, that the above formulas tell us *de facto* about? What is hidden behind the signs "a" and "b"? If we assume that "a" and "b" refer to something outside of them, and the relation of equality/ identity occurs exactly between these references, then "$a = a$" and "$a = b$" would not differ from each other, on condition that "$a = b$" is true. Such an identity would occur not between signs (as these are evidently different), but between what the signs refer to. In order to know that "$a = b$," however, it is not enough to separately analyse "a" and "b," it is necessary to look as if beyond them. The relation of equality ("=") indicates, thus, that "a" and "b" refer to the same object. In this way, we have specified what is common for the above formulas, but we have not yet specified how they differ. According to Frege, they have different senses, which makes him believe that when describing a sign it is necessary to point to what this sign indicates (what constitutes its *Bedeutung*) and to the way the object, to which the sign refers to, is given (what is called *sense*, *Sinn*; p. 62)[5]. When it comes to the sign, what it indicates is an object, that is something that would now be called *reference*. Using the category of "function," which is basic for Frege, it is possible to conclude that the relation between a sign and its reference is a function which maps signs into objects. A sign refers to an object through *Sinn*.[6]

In order to explain the meaning of sentences, Frege introduced a new category, that is the category of thought (*Gedanke*).[7] Thought constitutes

[5]An analogous distinction was adopted by Frege in his earlier work from 1879: *Begriffsschrift eine der arithmetischen nachgebildete Formelsprache des reinen Denkens*, where he differentiated between "begrifflicher Inhalt" / "conceptual content" and "Bestimmungsweise" / "mode of determination (of content)." He later abandoned this distinction and adapted *Bedeutung* and *Sinn*, respectively. This is pointed out, among others, by Beaney (1996: 151).

[6]A central category Frege considers is "function," its arguments are any particular objects, its values are only logical values. A specific type of function are "concepts" and "relations." To simplify, following Dummett, it is possible to say that "concept" is a one-argument function, whose value is the value of truth; "relation" is similar, but it is a two-argument function. Frege included functions and objects (which are not functions) to ontological categories; while concepts and arguments to semantic categories. Cf. B. Wolniewicz's Introduction to Frege (1977: XI-XIII), Frege's detailed considerations in *Funktion und Begriff* (*Function and Concept*), and *Über Begriff und Gegenstand* (*Concept and Object*) (Frege 1977), and Dummett (1981a: 234).

[7]"Thought" is an equivalent for the category of "proposition," and thanks to Frege, it is understood in this way in the contemporary philosophy of logic and philosophy of language. Thus, in Frege, a truth-value is assigned to propositions and truth is treated as a property, although not as a property in the ordinary sense, and above all not only as a property (Frege 1977: 106; Frege 1979b). It needs to be remembered that

the objective content of thinking and this is why it can be a "property" of many people who have different and subjective psychological processes of thinking.[8] Moreover, a thought is expressed in a sentence. Taking into consideration the fact that Frege is interested in sentences of the scientific language, and according to his assumptions, the aim of science is to pursue truth, the sentence analyses by Frege are the ones to which a logical value can be assigned. The transition from the thought to its logical value takes place in the act of judging Whereas propositions, which are the content of these acts, can be true or false. The sense of a sentence, thus, is something that has nothing to do with the issue of truth-value, for a proposition is recognition of a truth-value of thought. Frege closely connects the concepts of sense and truth-value. This is understandable considering the fact that the thought is grasped in a proposition, i.e. is sentential in character. In this way, we reach Frege's most famous claim that what is the truth-value of a sentence (Truth or Falsehood) is the sentence's meaning (*Bedeutung*). An affirmative sentence can be treated as a name whose meaning (*Bedeutung*) is True or False, provided there is such a meaning in the case of a particular sentence. In other words, a sentence is true if the object, which is an argument in a sentential function, falls under a concept. It needs to be added that a truth-value of a sentence, in Frege's theory, is secondary since what can be primarily claimed to be true or false is the thought.

Frege explains *Sinn* of an expression by means of *Bestimungsweise* or *Art des Gegebenseins*. The former can be rendered as the way of specifying the *Bedeutung* of the expression; the latter as the way of giving the *Bedeutung* of the expression (Żegleń 1993: 57).[9] Let's consider the following case. Every name refers to an object (and thus indicates its meaning/ *Bedeutung*) in a certain particular way. Even more, it can refer to the same object in many different ways and, as a result, have many different senses. In the case of names of fictional objects, a name may have no meaning (*Bedeutung*), but

Frege called properties concepts under which given objects fall. Cf. *Pojęcie i przedmiot* (*Concept and Object*) (Frege 1977: 56).

[8]Some commentators believe that, inasmuch as Frege rightly claims that it is possible for two subjects to grasp (think) the same thought, in this way criticising psychologism, he too often equates psychologism with idealism.

[9]The lack of precision of such an explanation makes some commentators attempt to express Frege's category more precisely. For it is difficult to establish what senses really are. They are neither objects, nor functions — what are they, then, in the Fregean ontology? For example, Wienpühl claims even that sense is a specific set of physical properties, because it is an object that functions as a sign (Wienpühl 1950: 488 and 492).

may have sense. The question arises: if the name "Athena" does not have a referent (to use a non-Fregean terminology), how is it possible that it has a sense that is a way of referring or a way of presenting this referent? If the referent does not exist, how is it possible to present this referent? Admittedly, the problem outlined above will concern only a certain group of names, and Frege was interested in logic and science, which he required to operate with names which have both *Sinn* and *Bedeutung*. He himself, however, allowed for such names devoid of meaning. They occur in colloquial language, in which many philosophers of language take interest.[10]

In order for a thought to be true in the Fregean understanding (i.e. understood as something time-free, eternal, non-relative, unchangeable), the sentence that expresses it has to meet certain restrictions. It has already been mentioned that what constitutes the thought is not the sense of any sentence, but the sense of an affirmative sentence. Moreover, each of these thought-components needs to have a meaning (*Bedeutung*). Thus, sentences whose components are names devoid of meaning, names which do not refer to anything — have sense, but have no meaning. A sentence having no meaning (*Bedeutung*) is, for example, (B): "Athena jumped out of Zeus's head," because neither the name "Athena," nor the name "Zeus" has meaning in the sense of *Bedeutung*. Therefore, sentence (B) has no meaning, and, following Frege, is *bedeutunglos*. In Frege's philosophy, such sentences are completely correct and by no means faulty (they function perfectly well in art, for example, in poetry). When we combine subject and verb, building the simplest sentence, we get only the sense of this sentence, and stay at the level of the thought, not moving an inch towards the meaning (*Bedeutung*) of this sentence. It is not enough, however, in such research areas in which pursuing truth is the main aim of interest, for example, in scientific research, including logic, whose main aim is to pursue knowledge, and, according to Frege, knowledge can be gained only by means of thought together with its meaning. Also, a sentence expressing the thought must be complete, in other words: completely specified, determined. Such complete sentences are sentences in the logical sense.[11] What needs to be taken into consideration in such sentences is the time in which the thought is expressed; for without

[10]Beaney solves Frege's problem by introducing the following principle: "there can be senses without referents, but no senses without veritable values" (Beaney 1996: 168).

[11]Frege also points out that only the main clause can be a full and complete sentence, and not the subordinate clause as it expresses the thought partially (Frege 1977: 74-75, 84, 88).

specifying the time, the thought is not closed, as in Frege's example: "That tree is green." Without supplementing the sentence with the category of the time in which it was uttered, it is not possible to regard the sentence true in a time-free and absolute manner (Frege 1977: 127). If, additionally, there are proper names and indexical expressions in the sentence, the speaker who uses them must be able to grasp the elements that constitute the thought (for example in the form of concepts) so that they are as complete as to specify, unequivocally and independently of context, the objects (referents) to whom they refer.

The thought, similarly to representations, is something sensuously imperceptible and at the same time, similarly to things, is something independent of the one who grasps a given thought, the one who is its carrier. Being between the world of representations and the world of objects, it is assigned by Frege to *the third realm*. It is possible, then, to grasp or simply think the thought, but it is not possible to create it, just as it is not possible to make the existence of things of the external world dependent on the ones who perceive them. Here, it is worth making an ontological remark. The thesis about the existence of *the third realm* is one of the most controversial theses of Frege. Much doubt is raised by the ontological status of thoughts: the way in which they exist. Frege admits that the reality of the existence of thoughts is different than the reality of the existence of things. He does not elaborate, however, in what way the categories of reality are different. What can possibly be claimed, although not very precisely, is that the reality of thoughts consists in its time-free and objective nature. In this understanding Frege remains a realist. Subjects who use language could be non-existent but the third realm could exist. There are some controversies about interpreting Frege as a Platonist. Many contemporary commentators do not regard him as such (Putnam 1996: 322). It seems that the mere fact that Frege adopted the thesis that Truth is a specific object, an abstract object, is sufficient to regard him as a Platonist (at least according to how Platonism is understood in the philosophy of logic and the philosophy of mathematics). Where do the doubts come from, then? It is possible to indicate two difficulties here. The first is the way Frege treats the concept of "existence." It was a purely logical concept of second order to him. Thus, the question about "the existence of thoughts" acquired a specific character in such a context. The other difficulty lies in specifying theses of "Platonism." For it is possible, following, for example, Dummett, to separate epistemological Platonism (as a stronger approach) from ontological Platonism (as a weaker approach), and ask which approach is closer to Frege. Treating Truth as an independently existing

abstract object is sufficient to adopt ontological Platonism. The answer Frege gives to the question about how it is possible to know objects understood in such a way, and how they are available to the subject, does not indicate that Frege adopted epistemological Platonism (if one considers the important role of intuition in knowing mathematical elements as a part of Platonism, Frege denies such a role to intuition) (Dummett 1981a). Dummett writes: "[for Frege] mathematical objects are as genuine objects as the Sun and Moon: but when we ask what these objects are, we are told that they are the references of mathematical terms, and 'only in the context of a sentence does a name have a reference"' (Dummett 1978: 212). Dummett adds that Frege can be regarded as a Platonist on condition that Platonism is treated as a form of realism and not of idealism.[12]

Since what constitutes the meaning of a sentence is the logical value of Truth or Falsehood, then this logical value cannot change, even if one of the elements of the sentence is replaced by another with a different sense but the same meaning. For example, in the sentences: "The North Star is shining with a beautiful light," "Venus is shining with a beautiful light," the meaning does not change, although the sense changes. What helps in recognizing if two senses are the same, is putting them in a certain intensional context. In other words, checking if the thoughts expressed in two sentences (A) and (B) have the same sense, is checking if it is possible that a given subject is convinced that (A), and at the same time is not convinced that (B). If it is possible, the senses are obviously different. Let's consider the following example:

Ola is convinced that (A): the Evening Star is the Evening Star.

Ola is convinced that (B): the Evening Star is the Morning Star.

Ola may be convinced that (A), and at the same time may not be convinced that (B) (after all, humanity has not been aware of this for a rather long time). Thus, the sense of the sentence (A) is different than the sense of the sentence (B). It has already been mentioned in this article that Frege was interested in scientific, and thus extensional, contexts. When he defines extensional context on the basis of analyses of meanings (*Bedeutungen*) of complex sentences he states that a change in sense does not result in a change in meaning (*Bedeutung*) (as in the example with the Evening and the Morning Star), and expressions with the same *Bedeutung* are interchangeable *salva veritate* in all extensional contexts, because their *Bedeutung* does not

[12]Frege's attitude to idealism is also not clear, and is rather difficult to specify clearly, hence various interpretations of his attitude. See, for example, Dummett's reflections (Dummett 1973).

change.[13]

In his considerations on language, Frege differentiates three elements which constitute what is contemporarily called *meaning*. These elements, next to *Bedeutung*, are the concept of *Sinn* (which has already been discussed), the concept of force (*Kraft*) and the concept of *tone* (*Färbung*).[14] Let's have a closer look at the two latter concepts. Force indicates that evidently there are various types of linguistic acts in language, such as: asserting, ordering, questioning, asking, etc. In these individual acts we deal with the different force of assertion, which is strictly connected to a truth-value. A language user uttering an affirmative sentence, states at the same time that such, and not other, truth-conditions have been met. The one who is asking a question is asking if the truth-conditions of a given sentence are met. Frege is the author of an important distinction in logic between "proposition" and "assertion," the two categories extremely crucial to research in the philosophy of language. He writes: "When we inwardly recognize that a thought is true, we are making a judgment: when we communicate this recognition, we are making an assertion" (Frege 1979a: 139).

In light of the above quote, it is possible to extend the present analysis to the category of proposition. Let's consider the two following examples about the Cologne Cathedral: *The Cologne Cathedral is big. / It is true that the Cologne Cathedral is big.* One of the sentences reads: "it is true that," while the other does not. Both sentences, according to Frege, grasp the same thought but the thought simply has two linguistic forms. If the thought is the same, then also the meaning (*Bedeutung*), that is the logical value of these sentences, must be the same. By recognizing the truth-value of the thought expressed in these sentences, we make a certain proposition, and by analogy, the proposition is the same in both cases. It is possible, however, to grasp the thought without making a proposition. It results from the fact that truth is not a part of the thought, but the thought is something that can be assigned with a truth-value. The acts of grasping the thought are themselves psychological acts taking place in the knowing subject. At this point, however, the reach of psychology ends. For in both acts we deal with recognizing something whose carrier is not the subject: namely the objective thought (Frege 1979b: 253). What constitutes the sense of a sentence are not these elements of language which express the mood and tone of a given affirmative sentence. It is irrelevant for assigning a truth-value

[13]Frege comments on this principle (adopted from Leibniz) in Frege 1950, §65.

[14]A lengthy comment on the Fregean category of force can be found in the article *Moods and performances* by D. Davidson (Davidson 1984: 109-121).

to a thought if the used word is "horse," "steed" or "mare."[15] That is, if the only element of the sentence expressing a given thought which is changed is the way in which a horse is specified linguistically, then the truth-value of the sentence will not change together with the modification. It will not change the meaning (*Bedeutung*) of the sentence. Following Frege, the logical value of these thoughts will be the same. All elements which do not influence the truth-value of the thought expressed in the sentence will belong to a category which Frege calls *tone*. The use of the word "mare" instead of "horse" will change the tone of a given sentence, but not its truth-value.

The concept of *Sinn* highlights the content aspect of meaning, and the concept of *Bedeutung* — object (referential) aspect. The laws of logic are laws obtained in logical-philosophical analysis of what Frege called the REALM OF MEANINGS (Frege 1979b: 122). The thought changes together with a change of context to such a degree that in any new context we will deal with a new thought; *Bedeutung* does not undergo such a change. This is especially visible when we consider the case of proper names. Different language users acquire different competences regarding, for example, the name "Aristotle." Some will identify it with "a student of Plato," others with "the teacher of Alexander the Great." Thus, it will depend on how this name is used in language in any given case. How the name "Aristotle" is understood does not play a great role (it belongs *de facto* to what we could call *language use*); *Bedeutung* remains the same. It is possible to claim that what we are dealing with here is a certain specified whole in which — as regards sentences which are fundamental components of language — truth plays an extremely important role. A certain dose of theoretical caution needs to be retained here. Were the meaning of a sentence to be reduced only to *Bedeutung* as a logical value, the category of *Sinn* would be no longer necessary. *Sinn* remains thus the element which allows us to specify the object reference of a given word or sentence to a greater degree. As has been remarked earlier, the remaining categories considered by Frege, such as "force" and "tone," do not influence the object reference. In such an approach, no reification of "meaning" is possible. Hence, as highlighted by Dummett, understanding a word by a language user is not only associating the word with something extra-linguistic from the world.

Despite introducing the category of thought, Frege is, above all, a theoretician of language and not a theoretician of thought (in the sense thought is understood in contemporary epistemology).[16] It seems, thus, that

[15]Frege's example (Frege 1956: 295).

[16]Here, I agree with Dummett and Burge (Dummett 1973: 384; Burge 1979: 401,

epistemological issues can be solved by means of linguistic research. As it is well known, such an approach has been named the "linguistic turn." In line with this turn, it is claimed that language is indispensable in knowing the linguistically independent thought, for the thought is accessible only through language. Dummett summarises Frege's research on language as follows: "Language may be a distorting mirror: but it is the only mirror that we have" (Dummett 1993: 6). Let's now consider the relation between sentence and thought in Frege. The thought is something different than the sentence which can express it. The thought exists independently of the sentence in the sense that connecting the thought with a particular sentence is not necessary. According to Frege's assumption, the fact that the thought co-occurs with the sentence follows not from the nature of thought, but the nature of man and human cognition (Frege 1979c: 269). This fact has additional consequences. The use of language is not important for the thought itself, as it is described by Frege, because it exists beyond language. It is grasped in the act of judging, thus the making of a judgment is a secondary matter. As we are interested in epistemological matters, a theory of meaning (or rather a theory of what Frege calls *Bedeutung*) remains strictly connected with the practice of using language, with language use. For the thought grasped by people may be grasped only linguistically. In this respect Frege is ahead of research conveyed later in the philosophy of language, for example by Wittgenstein. It seems that Frege believed that, in principle, the thought can be grasped independently of its linguistic representation, but he did not discuss in his theory how it is possible. How is it possible to grasp sense other than as a sense of a linguistic expression to which we can specify an object reference? (Dummett 1993: 11) Frege's belief originates from the way he treats natural language for he considered it a very imperfect and cohesionless tool for expressing thoughts. A tool in which general sentences can be treated as sentences about objects, whereas the latter are sentences about functions; a tool which does not provide an adequate description of indeterminate gaps, and which cannot precisely express the scope of a general statement (Sluga 1980: 144). This is the reason why he wrote: "a great part of the work of a philosopher consists — or at least ought to consist — in a struggle against language. But perhaps only a few people are aware of the need for this" (Frege 1979c: 270).

Frege wanted to create a language adequate for science. Such a language was supposed to be a language of pure thought, which would facilitate the

407, 409).

aim of science, which is truth. Such a language was supposed to be a formal language modeled on the language of arithmetic, as Frege wrote in the subtitle of *Begriffsschrift*. The problems connected with the imperfection of natural language, which caused great trouble for many generations of pre-Fregean philosophers, were solved by Frege with one simple move: namely, by ignoring this language. Frege did not aim at creating a systematic theory of natural language, but a precise and flawless language of logic. The categories of this new language could be applied also to natural language, and if it did not fall into the categories, then all the worse for it.

The basic units of meaning for Frege are sentences, and words only mean due to the fact that they appear in sentences. Dummett singles out two orders: ORDER OF EXPLANATION and ORDER OF RECOGNITION. In the case of the former, the senses of sentences have priority, in the case of the latter, the senses of words. It is only thanks to such a structure that we are able to explain how it is possible that we, as language users, understand completely new sentences. We can understand new words independently of sentences, but we can grasp their sense only by means of the way they are used in sentences (in order to utter something, to create a reasonable element of language used for communication, we need to create a sentence, or at least an expression in the function of sentence). This connects to Frege's other principle, clearly stated in *Die Grundlagen*: "never to ask for the meaning of a word in isolation, but only in the context of a proposition" (Frege 1980: Introduction, X).[17]

It is clear that, in order to avoid a certain circularity, it is not possible to explain the sense of a sentence by means of a direct reference to the senses of its components. This is why in Frege's conception — according to Dummett's interpretation (Dummett 1993: 23-33) — sense becomes linked to truth-value in such a way that grasping the sense of a sentence involves knowing truth-conditions of this sentence. And the truth-value of complex sentences depends on the truth-value of their component sentences. *Bedeutung*, thus, is an object reference for particular, simple expressions and for sentences built of such simple expressions. It needs to be remembered, however, that their *Bedeutung* constitutes the semantic value of truth or falsehood. *Sinn* is as an epistemic aspect of meaning. It helps to hypothetically assign a truth-value to a sentence, for by means of sense it is that sentences and expressions are given in language. Therefore, sense involves, as highlighted

[17]According to Dummett, both categories: that of sentences and that of words, are important for a theory of meaning, and there is no sense in arguing which of them, in general, has priority in this theory (Dummett 1973: 4-6).

by Dummett, knowledge on the part of language users, and has influence on specifying a cognitive value of sentences (Dummett 1991: 482).[18] In Frege's theory, strictly focused on making concepts important for logic and science more precise but less interested in the broader, pragmatic aspect of language, it is possible to notice that truth and language use are mutually connected. Namely, in language a sentence can be true due to the fact that the thought expressed in this sentence is true. Frege highlighted that true thoughts exist even when nobody grasps them. But, from the point of view of research on natural language, the following question can be asked: if an independently and objectively existing thought is given to man only through language, then do strictly linguistic aspects (connected to language use) not become important for this "grasping"? The concept of truth in the above approach is not primary to the concept of meaning; it is rather strictly connected with it. This is the reason why referring to truth-conditions cannot take place without referring to meaning which includes not only the sense of a sentence, but also other components of meaning (such as force and tone). Characterizing truth-conditions cannot disregard communicative elements of language.

Using Frege's logico-semantical research, contemporary philosophers of language, such as Dummett, Millikan (2001), or Horwich (1998), extend their reflections on natural language with its communicative aspect, strictly connected with language use. By the same token, they open ways for new interpretations of concepts tentatively formulated by Frege, and elaborate on Frege's analysis of *Sinn* which is expressed in language in completely new and extremely (philosophically) interesting forms.

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SEMIOTIC ANTHROPOLOGY IN POLAND[1]

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In British and American anthropological literature, the ethnology of Central and Eastern European countries has shared in the plight of descriptions of this part of the world: it was seen as exotic, foreign, remote, a backwater, focused on sideline problems and situated on the periphery of this field of science. This state of affairs has been the case since at least the beginning of the Cold War as the descriptions of the national characters of Eastern Bloc communities, drafted by American scholars (the so-called RAND project; *cf.* Kürti 1996: 12). The ethnography of these countries was automatically aligned with the same categories of description (along the principle of symmetrical reflection) which were applied to the characteristics of these communities. This was, in part, an effect of entirely different research traditions in the subject matter, objectives and methods of these remote parts of the science. The differences of 'cultural wholes' did have a decisive impact on the image of ethnology. Like all these communities, Polish ethnology was perceived as a homogeneous whole, which it never was.

In actuality, the ethnology of the countries of Central and Eastern Europe largely followed a course of development that was different from the theoretical trends that were obtained by Western science. However, in the 1960s and 1970s a structural and semiotic research orientation appeared which, as none before, brought together these two partially separate methodological worlds. From the outset, semiotic methodology was not a formation

[1]In this paper I use the terms ethnology, cultural anthropology and ethnography interchangeably, along with the practice applied throughout the most part of the discipline.

that might be called a 'school,' but other theoretical orientations in Polish ethnology share in this status, too.

Michał Buchowski (1995: 39) wrote several years ago of this ethnology that it is torn apart into thematic and theoretical monads, which are directed by attachment to some traditions of thinking on the perception of the place and importance of fieldwork in research practice, to the kind of interpretation and explication of phenomena performed and to the circle of people who share some ideas on the way in which one does anthropology. In this manner he described the ways in which various 'schools' and 'theoretical orientations' operate in contemporary Polish ethnology and exposed the plight of the field as a whole. The scholars who fall into the same category of 'anthropologists' disagree even on such fundamental issues as the subject of research, with its objectives and methods changing repeatedly throughout its history, which, incidentally, is a normal process within humanities. However, this accounts in part for its 'generalism,' that is clearly dangerous for the discipline. Vincent Crapanzano asks a blatant question: Why should we assume that cultural — social — anthropology has any unity other than through an administratively driven economy of knowledge? Why should we assume that unity is desirable? (Crapanzano 1995: 420) He continues to provide an answer that to reduce anthropology to one type of practice is to lose touch with reality. Another anthropologist adds that it is just a community of representations that have been shaped by history and geopolitics, with its partakers choosing its different areas (Ota 2002: 62).

Is semiotic anthropology an exception in being unaffected by the disease of 'vagueness' of its objectives, subject matter and method? Most certainly, the adjective 'semiotic' determines its theory and practice in more detail, albeit imperfectly. We realize the difficulty in the definition of the term 'semiotics' and reconciling the two traditions of de Saussure and Peirce, as well as its inclusion in the anthropological practice still under way which, in the many local traditions, has various objectives and expectations. However, within 'Polish semiotic ethnology' there is consensus on what anthropology is. In paraphrasing Peirce, it could be said that semiotic anthropology has as its starting point some habitual manners of thinking and behavior (quality of being self-evident) and sets out to discover the rules of arriving at convictions in some communities. This is how a number of scholars define anthropology: they see it as systematic critique and reflection of common representations — common ways of understanding the mechanisms of life (Geertz 2003: 47; Herzfeld 2001: 12; Robotycki 1995: 232; Stomma 2002: 9). Because common knowledge makes the world (life) transparent and unambiguous, 'critique'

gives easy answers, catering to popular demand and needing no agreement with facts but relying solely on its inner logic. According to the famous saying by Boon, the task of anthropology is making what is foreign more of your own and making what is your own more foreign. Surely, anthropology does not do that for the sake of aesthetic pleasure but, rather, for understanding, which he equates — as do all semiotically oriented anthropologists — with translation.

Semioticians disagree with a substantial part of the ethnological community, who (whether 'traditional' ethnographers or postmodernists) are in favor of the need for symmetry between the reality and its description. One of the tokens of the love of this symmetry is a naturalist view of description being independent from interpretation — the transparency of the language of description. Another manifestation of this attachment is a common opinion that the use of complicated research is necessitated by the degree of complication in the reality which is the subject of description and interpretation — the more complex the reality the more sophisticated the procedure has to be. So, a description unaccompanied by interpretation is considered sufficient if the reality is simple (obvious) in the scholar's opinion (traditional ethnography), but when the reality is more complex, it needs the use of an interpretative procedure that is at least as sophisticated as itself (postmodernism, phenomenology); in the latter case the reality's non-cohesion and its non-self-evident quality is reflected symmetrically in the language and interpretative procedure being fragmentary and non-self-evident. Symmetry is in both cases not only a diagnosis but also a way in which the cultural reality is to be made sense of, but it is also a scholarly directive[2].

[2]Symmetry is sometimes posited as a directive of investigating phenomena "in their proper context," which only creates appearances of postulating a contextual description of cultural phenomena — it can be seen in the following example. Janusz Barański (1992) confronted two scholarly approaches — a phenomenological one by Z. Benedyktowicz and a structuralist one by L. Stomma — and attempts to refute the charge of 'methodological totalitarianism,' which Stomma leveled against the former, but to no avail. Worse still, by way of defending phenomenology, he himself exposes himself to a similar charge. The confrontation occurs through the 'elephant metaphor' (this model shows the way in which cultural, particularly religious, phenomena are investigated, is well-known in Polish ethnology). According to 'phenomenologists' an elephant (i.e. a religious phenomenon) is supposed to be investigated 'on a scale commensurate with itself.' The scale — devised using a key, which is only known to phenomenologists (including Barański) — is a zoological one (with a religious one applied to religious phenomena). This seems self-evident. But, according to structuralists, an elephant (a religious phenomenon) can be investigated on various scales that are compatible with

Semiotic anthropology as an 'art of translation' asks not about the nature of this world and does not pose ontological questions, though it is not rid of this type of undertaking; it asks not what the reality is (such questions go beyond anthropology). Anthropologists ask what the truth is for 'these people' in this local situation. This is why the 'presumed' discovery by postmodernist anthropology that 'ethnography is fiction' (in the sense that it generates the image of the world rather than simply reflecting it), will not arouse a revolution in the semiotic community because a translation always occurs between semiotic systems (a reduction is always necessary here), rather than between semiotic systems and a reality independent from those.[3] The process of translation (multiple and multi-stratum) occurs in anthropological practice: it is part of fieldwork, where the experience of the researcher gets transformed into a 'note from fieldwork', which in turn serves as basis for the writing of a monograph or paper.

Translation as a 'base metaphor' that determines what semiotic anthropology is, as well as a basic directive on what it should be, demands that a scholar be detached from the reality they investigate. This critical detachment has been called the 'ironical attitude' (a view from far away) in anthropology. This is some distance that is supposed to hold regarding our own cultural truths and those which the professional culture of the discipline equips us with. Polish semiotic ethnology was here inspired by the prominent Polish scholar Jan St. Bystroń, who wrote in *Komizm*:

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a cultural interpretative framework, which in a given context equips the elephant (a religious phenomenon) in meaning. The elephant belongs to the world of cultural taxonomy (the world of fauna is also a semantic domain, a cultural artefact of the western world), and this creates an extensive network of relations between its elements, where, depending on the context of 'usage,' different types of relations and different parts of meaning are given preferential treatment (so, not necessarily a 'zoological scale' in the case of an elephant or a 'religious scale' in the case of religion). In a phenomenological view, there is a scale that is privileged by NECESSITY (a 'proper' one), whereas for structuralists the preference is just 'whimsical social acceptance, which means that elements of culture are not self-evident' (Stomma, after Barański 1992: 20). So, explaining a religious phenomenon in a constrained, predetermined context appropriate to it (above cultural taxonomy, beyond semantics and culture pragmatics) is a 'methodological totalitarianism' — a hermetic desire to reflect the reality in the language of the description of this reality, as the preference given to the meaning is not a function of culture but one that is given by necessity.

[3]In the lecture that closes the semiotic conference commemorating Yuri Lotman (Tartu 2002), Alexander Pyatigorsky confirmed that any applications of semiotics can only pertain to culture alone — that which man has created. Paraphrasing Levi Strauss, he said that 'there is no raw, only cooked' for semiotics.

> Obviously, I have no illusions and realize that a great number of readers will treat this book as a collection of more or less exhilarating stories and funny concepts. Let that be! If the theory turns a failure, let it at least be useful in this unintended capacity. There are so many books around the world, with most dignified titles, which do not even provide this benefit[4]

In his famous parodist paper on the bizarre bodily rituals of the Nacirema people[5], another great forerunner of 'anthropological self-irony', Horace Miner derides the formalized tendency by scholars to theorize about everyday phenomena. However, instead of sheer mockery of how easily scholars get deceived by their knowledge, Miner proposes a serious epistemological question: why should the assumed rationality of the western lifestyle fail to be targeted by an anthropologist's sardonic look (Herzfield 2001: 2)? In the 1970s, anthropology itself was included in the term 'lifestyle.'

What constitutes an anthropological approach, then, is the skill of critical thinking not only about the 'subject' of our research but also of the description and interpretation tools (professional culture). This fact has been appreciated by the greatest American semiotic anthropologist M. Herzfeld (2001: 5) when he wrote:

> While I am cautious about the risk of inflated ideas about what the discipline can do for the world at large, I would also argue that – at least in the classroom, hardly an unimportant place, but also in all the other arenas of opinion formation to which anthropologists have access from time to time - there is great value in the destabilization of received ideas both through the inspection of cultural alternatives and through the exposure of the weaknesses that seem to inhere in all our attempts to analyze various cultural worlds including our own. We need such a counterweight to the increasingly bureaucratic homogenization of the forms of knowledge.

[4]Quoted after Ludwik Stomma, from the entry of his making on "Jan Stanisław Bystroń " in Benedyktowicz et al. 1980-1981: 49.. [trans. L.K.]

[5]Which, read in reverse order, betrays the proper subject matter of description.

Czesław Robotycki (1995: 232) similarly claims that nowadays "there is a need for self-consciousness that by participating in the sustenance of the world of values one creates cultural fiction. Its evocation (of self-consciousness, not fiction — *M.B.*) that is the task of critical ironicists." Also, the ironical attitude involves semiotic anthropologists' mistrust in 'universals[6]' and sweeping statements.

Nancy Scheper-Hughes (1996: 5) perfectly illustrated the difference between the scholarly approach by a semiotically-oriented anthropologist, creating the so-called 'thick description' (Clifford Geertz 2003), and a folklorist using ready-made interpretative calques, which he trusts more than local experience. In Brazilian and South American districts of poverty around big cities there are widespread stories about hunting children and poor people for 'spare parts for the body.' Alan Dundes, a great American folklorist, immediately spots in it an archetypal pattern of a mythical story, circulating in various parts of the world, that is, something that hardly goes with local conditions and lifestyles, power relationships and cultural representations of people who pass these stories on ('look from far away'). Sheper-Hughes notes that the stories are strongly related with the environment where they function, and that this apparent similarity creates an illusion of their sameness in different parts of the world. In her opinion, they not only betray a reluctance to new technologies or a fear that these have gone too far, but above all they testify to social retardation, maltreatment and exploitation of the poor in medical practice: she demonstrated examples of the bodies of the poor being buried in the wrong graves or going missing in cemeteries, which makes it impossible for the family of the deceased to honor the dead by visiting the cemeteries and saying prayers at the tomb, but the corpses are also misidentified and go missing in hospitals and clinics. Illiterate people who remain 'anonymous' or have their given names created from some insignificant localities on the map, are doomed to remaining unknown, abandoned, negligible. When they die in hospitals, their bodies are taken over by the state, and therefore the slums people are petrified of hospitals and dying there, particularly for fear that the autopsies there are just about an acquisition of 'spare parts for the body' as payment in kind for state health care. People are convinced that it is only after death that their bodies become valuable, and therefore the stories about stealing worthless people

[6]Though it is a negative example, Anna Wierzbicka's research on universal semantic metalanguage is of great support to anthropologists' theses; these imply that only upon its completion will any valid and reliable cross-cultural comparisons be possible. So far, such a prospect seems very remote, if not outright utopian.

for the sake of their organs are part of a complex socio-cultural situation in which they find themselves, rather than some universal inventory of a folklorist.

To understand the essence of Polish semiotic ethnology, centered around a group of scholars from the so-called New Polish Ethnology[7], one more introductory remark is necessary: until the mid-1970s the dominant research paradigm was one described as positivistic or modernistic, in line with which the role of ethnography was reduced to recording and describing the transformations in folk culture because in the system of 'people's democracy' attempts were made to present folk culture as more valuable in it being a carrier of truly human and national values. Also, ethnography was perceived as a science investigating the palpable world of material, social and spiritual facts where direct observation and 'testimonies' by the interviewees were the evidence of the authenticity of facts that were 'merely' being described. (*cf.* Buchowski 1995: 41).

This type of thinking was opposed in the late 1970s and the early 1980s by a group of the then young scholars with structural and phenomenological affinities — their 'new tribe' (voluntary adherence, flow of membership, relative transience of ideas and no strict center of power) who described themselves as the New Polish Ethnology [hereinafter: NPE] remains until this day probably the most interesting, original and inspiring phenomenon of Polish ethnology.

Two orientations surfaced within it immediately: 1. structuralist-semiotic and 2. phenomenological-hermeneutic. The first of these points to the myth-creating nature of thinking and the role it plays in history (Stomma, Tomicki); it borrows from three theoretical traditions: French structuralism and semiotics (Levi-Strauss, Barthes, New History) (Stomma), British structural anthropology (Leach, Dougless, Turner) (Wasilewski) as well as the Tartu school semiotics of culture (Lotman, Uspensky, Toporov, Ivanov); it could thus be said that structural semiotics is dominant[8].

[7]The leaders of the group were from the very beginning: Ludwik Stomma, Jerzy Wasilewski, Czesław Robotycki, Ryszard Tomicki and Zbigniew Benedyktowicz. The latter is the main exponent of 'Polish phenomenological ethnology.'

[8]Mikhail Lotman, son of Yuri Lotman (well known in Poland), from the Tartu Institute of Semiotics still calls the 'semiotic of culture' done by the Tartu-Moscow school a 'structuralism from Tartu' (Lotman 2000: 24); this affinity is recognized by Polish semiotic ethnology, which only slightly strayed from the type of structural analysis proposed by Claude Levi-Strauss (see Piątkowski 1993, Stomma 1980, Wasilewski 1980), and which virtually disregarded the possible applications of, say, Peirce's semiotics.

Today, the researchers associated with this 'revolution' are beginning to head Polish ethnology, not only by chairing university departments but also by being classics in the field.

The manifesto of this community from the early 1980s read s that these researchers shall:

1. abandon positivist[9] and post-positivist orientations in ethnology for the sake of systemic descriptions, for which the starting point is mental and conceptual categories in a given culture, rather than imposed subjective scholarly categories;

2. apply a coherent and consistent conceptual-methodological apparatus which stresses the notional side of cultural phenomena;

3. focus in their research on the system of the so-called spiritual culture (rituals, religiosity, mythology, folk literature, cultural identification, etc.), as they have accepted that it is in the sphere of the spirit, the ideational sphere of culture that mechanisms should be sought which control the totality of cultural behavior and phenomena;

4. abandon random descriptions of the phenomena of culture, which had been forced, as it were, by formal pseudo-classification (unrelated to the way in which the culture is classified by those under investigation), and focus on synthesizing and interpretative work designed to reveal the *longue durée* structures, regardless of whether or not those exist as universal cultural laws as the grammar of culture, that is, a set of basic opposites, upon which cultural practices are being superimposed (here: Stomma);

5. advocate interdisciplinary approaches, understood as multi-faceted use and assimilation of contemporary achievements of relative disciplines, chief of those being history, semiotics, religious science, science of literature and linguistics (*cf.* Benedyktowicz *et al.* 1980-1981: 47).

[9]The term 'positivism,' which in Western anthropological literature is more commonly referred to as 'modernism,' is a by-product of the discussion that swept across Polish ethnology in the 1980s and 1990s and what it really means is gullible realism — an approach that prefers the researcher's point of view; its constitutive parts are rationalism that transcends the boundaries of cultures or objectivity, unshaken by one's own cultural system and as transparent as the reality described.

Nowadays, these scholars stress the interpretative[10] character of the ethnological profession. However, this means they realize that an ethnologist constructs initial data (is the semiosis of the culture being investigated) by way of their own cultural tools, including those which professional anthropological culture equips them with, and thus ethnology is a sort of culture critique (having an axiological bias). However, as opposed to American researchers, semiotic ethnologists do not fetishize the fact, and do not suffer from 'moral hypochondria' (Geertz (1998) or D'Andrade (1995)), which manifests itself in a greater commitment on the part of the author in the first person rather than in that which was supposed to be the subject of their research and interpretation. The 'ethnography of ethnography' is for them just a necessary component part of an internal epistemological debate, but it does not make any daunting impact on the research practice. Sometimes it accidentally exposes a 'taboo' of professional ethnological culture, as is the case with the deliberations by Zbigniew Libera (1995c) on the cultural image of an 'arse.' The subject matter appeared so inappropriate that it was subjected to some inner censorship[11] of sorts that eliminated from the research practice any topics considered to be 'inelegant' — it was a kind of transfer of what was obvious in one's culture to the language of ethnology, unaware that such a procedure was being performed.

In this context it was postulated that anthropology was a reinterpretation (Robotycki 1995). This is an interesting suggestion, at least for some part of the discipline (reinterpretation of itself as cultural/textual practice), and it is actually under way already. Zbigniew Libera (1995a) carried out a reinterpretation of the output of 19th century ethnography, showing it as some kind of literary rather than scientific practice (even though materials in folk ethnology were long deemed the most reliable in ethnography), and used ready-made literary calques in the descriptions of country people — it shifted the role of this ethnology from the supplier of data to the object of ethnographic research. Also, ethnographers are attempting to raise issues that were ignored or misinterpreted by previous methodological approaches. On the other hand, semiotic anthropology has always been a reinterpretation — a secondary interpretation of some other interpretation (Geertz 2003: 45).

[10]In this case the point is stressing the fact that ethnography, even at the level of description, is interpretation.

[11]The topic was recognized too low for the thesis to be considered a habilitation dissertation; one dreads to think of ways in which famous folklorists would be treated: Alan Dundes wrote great works on scatology whereas Sigismund Freud's salaciousness far exceeded Libera's moderate effort.

The interest of the NPE and its successors is mainly focused on contemporary phenomena, such as ones of popular culture, using in its appeal mythical structures of thinking, the functioning of these structures in common knowledge (advertising, film, popular and children's literature, school textbooks, music, architecture). But within its interest is also folk medicine, the body as a socio-cultural construct, gesture and history as an area of permanent semiosis[12] as well as mythicized awareness of ethnology itself, that is, the processes of fetishization (reification) of the metalanguage of ethnology. Its research also focuses on the ideological implication of norms and attitudes, cosmological-ritualistic visions of the world and issues of cultural myth-making in the own-alien relations (the traditional discourse on local and national differences has expanded to include AIDS, aging, disease). Also, there is research in the process of the stereotypization of culture, which equally affects professionals and those who deal with culture as a hobby (museums, academic institutions) (*cf.* Robotycki 1995: 234).

Methodological directives that these researchers conform to are directives that are present within all the structuralist-semiotic traditions mentioned, the most important being that 1. explaining culture through culture (Libera 1995c: 17) leads to a search of an inner logic of culture, even though — once detected — it often served as a secondary rationale for the theses or explanations (*cf.* Libera 1995c: 18); 2. concerning the relationship between data and evidence in ethnology, a. a coherent conceptual apparatus of the discipline needs to be applied so that its concepts will not be reified (and thus make the reality being investigated mythical); b. natural language[13] has the status of ethnographic data; here, these researchers stress the descriptive and classificatory character of natural language that is reflected in the semantic structure of words — therefore linguistic data still play an important part in their investigations, particularly in semantics, and they enable a reconstruction of cultural classification schemes as well as social functions of the phenomena being studied (Libera 1995c: 27)[14].

[12]Edmund Leach once wrote that it is not worthwhile to investigate what really happened and what is a myth, but a question should be asked why some facts, true and false, were remembered while others — though true — were forgotten.

[13]On the other hand no attachment has developed to the concept of the primary system and secondary semiotic systems, such as in making an assumption, after Toporov and Zolotaryev, in a series of texts about the body and, in particular about the image of the body as a microcosm, that in man's relationship with this world, it is man and the body that are the models.

[14]As Libera puts it: "The definitions of bodily parts perpetuate what is relevant and eliminate what is redundant. Thanks to that, language gives an account of what a

The starting point for ethnological research is fieldwork, where the reality under investigation becomes textualized (semiosis) — what is not an ethnological text turns into one that becomes analyzed[15]. Semiotic analysis in ethnology serves several purposes:

1. extracting sensible wholes (signs) from a given text of culture[16],

2. investigation of the relationships between:

(a) extracted wholes within a text of the culture where these belong (syntactic, semantic and pragmatic relations); here we ask:

– why do some signs play an important role within a given text of culture?

– why were some signs selected from the inventory of possible signs?

– what is the significance of these signs?

– what is their potential meaning? What are their potential variants within the given culture (analysis of symbolic), realized in a given context (analysis of homological relationships)?

– why was this meaning chosen rather than some other, with the meaning of the part having been confronted by the meaning of the whole (the context of the whole — an analysis of systemic reactions) (cf. Stomma 1980: 130-132)?;

(b) semiotic systems that create an intra- and supra-textual context of a phenomenon being investigated thanks to which we acquire knowledge of the meaning of the particular parts of the text as a whole (Stomma 1980; Wasilewski 1980).

In recent years, Polish scholars have creatively contributed to the work on the concepts of TEXT and MYTH, which are fundamental for semiotics. In his most recent work, Czesław Robotycki (1998), influenced by deconstruction, revises the concept of a text of culture and replaces it with NARRATION. The reason for the change is simple: the term better corresponds to a situation in which "the world makes no attempt to communicate anything to us," is a steady narration without framework delimiting its reach (which is the case with a text). Framework is an artifact of culture. He writes

given body part is, what it does, and allows a distinction and association of different body parts" (Libera 1995c: 21).

[15]As this is a complex process, its description goes beyond the bounds of this paper.

[16]It is customary to see the treatment of cultural phenomena as texts, as a condition of their comprehension, translation.

that "it is us who make sense of history" (1998: 11) with the word 'history' to be substituted with anything at all that is governed by semiosis.[17] Also, the concept of 'TEXT' has become banal by overuse, by being exploited in so many contexts that we hardly recognize it as text, with the only reason for its functioning being some peculiar intellectual fetishism that is hard to grasp.

The concept of myth and mythical thinking is now being subjected to modification, although it remains a universal explanatory category, the most effective interpretative tool for a broad spectrum of cultural phenomena, a professional anthropological culture category of a self-evident nature. Zbigniew Libera (1995b: 11), in his works on folk medicine and body anthropology, modifies Roland Barthes' proposition, whose staunchest advocate in the Polish context is Ludwik Stomma, that "myth is stronger than facts" or that "myth seeks congruity with sense rather than with a sensuously perceived reality." Stomma writes that "myth-making products have no relationship to reality, which cannot verify them," "experience is less significant than myth and must concede in confrontation with myth" and provides arguments that support the proposition. As exemplified by 'folk medicine,' Libera demonstrates that the effectiveness of a number of medical procedures is not purely accidental, which Stomma's logic-over-practice proposition (abstracted from real life) would imply, but that it also has its empirical origin. Medicine does not lend itself to a reduction into myth as the experiments of myth are not the same as the experiments of folk medicine, which do not occur in an abstracted space of purely logical operations. If it were so, any treatments could be applied to any medical conditions as long as they fulfilled the requirements of this logic. Libera postulates that conviction-practice relationships be excluded from the scope of the extractable domain of culture (here Libera remains loyal to the term 'text of culture') though recognizing their mythological basis, so that this area as an element of a greater, sensible and coherent whole, that is, the picture of the world of a given community. This allows him to embrace a proposition that different texts of culture realize the same paradigm of sense and have a shared inventory of meanings, which is not to say that semiotic systems are synonymous: they always retain some autonomy (Libera 1995b: 12).

The concept of myth retains a principle that myth is about an inversion

[17]Here, semiotic ethnology gets dangerously close to the 'ideals' of postmodern and naturalistic anthropology with their zeal for the quest of symmetrical ways of reflecting the reality.

of the orders of culture and nature — demonstrating, on the one hand, social, ideological, historical creations as natural but, on the other, representing the direct products of socio-cultural relationships and the associated moral, aesthetic complications, as well as those related to class and ideals, as originating *per se;* this leads to their being recognized as 'good laws,' 'the voice of public opinion, 'norms,' and noble principles — innate things, given by nature (Stomma in Benedyktowicz et al 1980-1981: 48). Effective interpretations of a number of phenomena of the contemporary culture (advertising, political or economic discourse, history and science) are still being carried out within Polish semiotic ethnology on the basis of this definition of myth. The authors from the NPE, while pointing to a symbolic character of culture and the plurality of the manners of semiosis (history, traditions, local and regional identities) and the antinomies generated by these processes, permanent and continually overcome, not only show the process of semiosis as a continuous process that does not know a simple reproduction of patterns, but they also indicate myth as the main source of an overcoming and reduction of the unlimited possibilities of semiosis.

An example from Libera (1995b: 98):

> Partakers of culture endeavor to impart a mythological sense on everyday reality. First, 'real' properties of things are taken into account (so perceived by the 'spectacles' of the culture) and their selection are dictated by practical use. Next, the existing choice is subjected to additional selection motivated by the logic of myth. Ultimately, pragmatism has a purely mythological sense as ritual comes to include only that which is 'real' from the standpoint of myth. Thus, in overlaying a specific situation, rituals corroborate the agreement of common experience with the sacral image of the world. [trans. L.K.]

A partaker of culture, in their intimacy with texts that render themselves to being read in a number of ways, tries to neutralize (muffle) the effect of paradox by mythicizing reality. In their demythicization (semiotic anthropology, as understood by the NPE, sets out to reveal the rules that govern a text of culture) an anthropologist re-codes the contents of the mythicized passages of culture along the terms of their own practice, following professional anthropological culture.[18] *bricoleur*). The process of transforming

[18] One more remark: for ethnologists, the subject of interest and interpretation

available data into a document that goes on to be interpreted can be called 'entextualization' (by Greg Urban, 1996). This process always means a reduction or selection, but if we want to understand anything from the reality in question, there is no choice — either 'oppression of depression,' as the latter means there is nothing that can be understood or written. Lotman (1999) (and, earlier, Sławiński 2000), points to the fact that understanding needs a common ground (borderline area) which will serve as an arrangement of translation (shared code elements) and the bulk of an anthropologist's effort, such as local fieldwork, is focused on the creation of this common ground (*cf.* Rabinov 1977). This is where the 'moral hypochondria' manifests itself, and it is instantly transformed by the NPE into an element of controlling the present practice. These scholars do not share the modernist or positivist view implied in the 'moral oversensitivity' that translation is supposed to reflect or copy; on the contrary — it must deform and distort in order to be able to understand that which is the subject of the translation. One needs to come to terms with that and practice interpretation. Otherwise we would be left with enslaving and inactivating moral anxiety or a restoration of the myth 'science as a reflection of nature;' worse still, we would abolish the distance between the researcher and the subject of research, which is a condition of anthropological cognition. The NPE does not manifest in suicidal drives, even if it is slowly dying.

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SOME REMARKS ON THE ANALYSIS OF LEGAL CONCEPTS

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§ 1. INTRODUCTION

The nature of legal studies seems to endorse the view that by design law is a linguistic phenomenon. Indeed, language is the basic substance and essential tool used in legal practice. To quote Zygmunt Ziembiński: "One would expect legal professionals to be especially sensitive to the issues debated in philological or logical semiotics. But one gets the impression that jurisprudence approaches linguistic studies with certain dislike or mistrust" (Ziembiński 1985: 340). This seems particularly striking at the University of Warsaw, after all, an heir to the Lvov-Warsaw School with its trademark focus on language. Puzzling indeed, considering that the tradition at hand is not likely to become obsolete, as philosophers subscribing to it not so much share views on fundamental philosophical issues, but rather attitudes towards philosophy, the scope of its problems and methodological convictions (Woleński 1985). Long story short, close to all exponents of the school sided with an analytical approach and a skepticism towards holistic philosophical systems, while striving for an exactness and clarity of opinions they had to offer.

It is not that the accomplishments of the Lvov-Warsaw School failed to have any impact on developments and shape of Polish jurisprudence. An accurate although maybe not comprehensive account thereof is provided by Jan Woleński in his paper on both personal and substantial influences of the School on jurisprudential *milieu* (Woleński 1985: 287-300). Woleński argues that reism proposed by Kotarbiński was debated by Vilnius-based

lawyers, among others civilist Jerzy Zajkowski. A somewhat weaker version of reism, assuming that there are not only things but also processes (such as law), inspired some concepts of Wiesław Lang. Directival theory of meaning proposed by Kazimierz Ajdukiewicz was even more popular and was applied directly by S. Frydman, B. Wróblewski and F. Studnicki. The majority of it was, however, made by Jerzy Wróblewski who employed it to develop his ideas regarding legal interpretation and put it in the core of his theory of normative directives.

There is, however, much unexplored ground in this field. This paper is not, of course, aspiring to cover it all or even name everything that is left to investigate. Its primary goal is to answer the question of whether certain concepts forged in the Lvov-Warsaw School, specifically by Tadeusz Kotarbiński, can be applicable in legal studies; and if yes, what place do they occupy on the imaginative map of legal methods. Already from the outset one must make reservations that these findings should be treated with utmost caution, and it is almost certain that they should never be used to draw conclusions of axiological or ontological character. For, as Jan Woleński remarked in the aforementioned essay, it is impossible to know whether using the concept defined by the philosopher must necessarily entail that the individual applying it is aware or accepts philosophical background of the explanation provided (Woleński 1985: 288).

Since the paper focuses on language, one should first clarify what kind of language one has in mind.

§ 2. LEGAL LANGUAGE, LANGUAGE OF LAW, ETHNIC LANGUAGE

At the very least, a lawyer recognises certain linguistic specificity in the following kind of texts:

- texts of normative acts
- texts of court's rulings and administrative decisions
- texts produced by legal doctrine
- texts executed while completing broadly conceived legal transactions.

All those are expressed in the language of law. It is therefore a *sensu largo* term, encompassing all law-related texts. This understanding of the term "language of law" would require some kind of clarification, namely

where it stands in relation to ethnic language. It appears to me that there are two levels of generality, on which one can approach this problem. First, one may seek to explore relation between the specific language of law and specific ethnic language — for instance, between the 1964 Civil Code and the Polish language. Second, one may study general features of languages, in which one formulates any given text within any legal system, and look how they relate to general features of ethnic languages. This paper examines only the first, more specific level.

The first possible take on the issue plays on the opposition of natural language and artificial language. By "artificial language" one means usually a technical language created at a certain moment in time by a group or an individual to achieve some ends. From this point of view the language of law is a mixed one — suffice to say that countless rulings of higher and lower courts resort to Polish dictionaries when deciding cases. It is therefore safe to say that the language of law is dominated by the elements of ethnic language co-existing with elements of artificial origin, constructed consciously by the lawmaker or legal theory. Among those artificial elements are, for example, special sematic rules established by the lawmaker, arbitrary definitions of certain words or, interestingly enough, some predetermined syntactic rules that set apart the syntax of the language of law from syntactic rules of natural language. Consider for example the first sentence of art. 24 of the Civil Code: "A person whose personal rights are at risk of infringement by a third party may seek an injunction, unless the activity complained of is not unlawful." This peculiar, if judged in terms of natural language, sentence means that any person, whose personal right, e.g. good name, respect or health, was risked by other peoples' actions is entitled to request this action to be stopped. However, she is not right to do this if the infringing person acts pursuant to the rule of law. The policeman apprehending the criminal undoubtedly violates such a personal right as freedom, but acts lawfully. It seems that, if one views things from the perspective of natural language, it would be clearer and more reasonable to phrase the first sentence of art. 24 of Civil Code as follows: "A person whose personal rights are infringed unlawfully may seek an injunction." Ethnic language, it seems, ascribes the same logical sense to both of these sentences. But it is not the case with the language of law, which by employing the phrase "unless the activity complained of is not unlawful" shifts the burden of proof from the violated party to the infringing party. It is an exception from the general principle of the burden of proof enshrined in art. 6 of Civil Code that states that the burden of proof rests on the person who deduces legal consequences from

the facts to be established. The first take on the presented relation requires one more annotation: degree, to which the language of law is saturated with artificial elements, it is varied and prone to change when comparing various legal systems, similarly it regards various branches of law existing under the single system (compare art. 10 of the Civil Code and art. 10 of the Penal Code — each sets a different threshold for adulthood).

The second possible approach to the issue regards the language of law as an individual language of the lawmaker. For this reason, lawyers should take into account particular qualities of the lawmaker that separate them from other users of ethnic language and modify their linguistic behaviour — as any other user of language, the lawmaker has some inherent features. Specifically, he possesses certain knowledge and has some predetermined preferences (needless to say, we do not mean here any specific individual taking part in the legislation process, but the lawmaker as such). It is by including these that the wording of legal texts is often assigned meaning that could only be understood differently if those idiosyncrasies were not factored in its interpretation.

The third, and last approach, treats the language of law as a type of ethnic language. Here, one assumes that ethnic language is not a seamless and solid whole, but rather a conglomerate of various types of ethnic languages that, if at all, may be contained in a typology, but never in a classification.

In Polish legal studies, the relationship between the language of law and legal language was unpacked by Bronisław Wróblewski in his seminal 1948 paper where he applied a linguistic approach. Language of law is defined as the language of the lawmaker, it is therefore a language of normative acts. Legal language may be defined as the language of lawyers — theorists and practitioners speaking or writing about law. Legal language is thus employed to frame doctrinal debates or produce court rulings. It may be said that by making the above distinction one positions the language of law as the primary language, with legal language being a metalanguage — a language about the language of law. Finally, the "language of law *sensu largo*," hinted on above, would be a term covering both. It may be of use to take a closer look at similar structures of other ethnic languages. In French, the proposed distinction is clear right from the outset as one uses a nominal structure with the preposition "*de*" in the first, and adjectival structure in the second case. Hence, the terms are *la langage du droit* and *le langage juridique* for language of law and legal language, respectively. German theory, in turn, which alongside French legal thought has had the greatest impact on the Polish legal system, largely departs from this model. The prevailing

terms used there are *juristische Sprache* or *juristische Fachsprache*, but *Rechtssprache* and *Gesetzsprache* also enjoy some popularity. Denotation of these words does not overlap with the above-outlined Polish or French meaning of the terms. For instance, *juristische Sprache* corresponds with the "language of law *sensu largo*" rather than with "legal language," since it includes both texts of legal acts and any other legal texts. *Gesetzsprache* would be the equivalent of "language of law," while *Rechtssprache* has no unambiguous meaning. In Anglo-Saxon *common law*, one speaks of *the language of law*, or, at times, of *legal language* or *juristic language* but one attaches little importance to those distinctions.

One more remark. As presented above, such terminology ignores the non-written laws, such as custom, which particularly in international law remains a significant source of law. This objection holds. But such is the price to be paid for clear and precise terminology.

§ 3. METHOD

To assess the applicability of the conceptual analysis made by Kotarbiński, one has to first consider where to put it, if only in an experimental vein, on the map of legal methods. But before embarking on this task one needs to provide at least some typology of this field. The topic is a vast and complex one, but legal theory, for example *Methods of Legal Reasoning* (Stelmach and Brożek 2006), has managed to clarify three basic positions on the issue in question.

To begin with, one may assert that jurisprudence and other branches of legal thought are unable to develop any scientific method, nor do they need such. This was first expressed explicitly in the article *Die Wertlosigkeit der Jurisprudenz als Wissenschaft* [*The Worthlessness of Jurisprudence as Science*], published in 1847 by Julius Hermann von Kirchmann. Abandon all methods, says Kirchmann, and give priority to intuition, it cannot be taught or learned, but eventually sorts mediocre lawyers from the good ones. To achieve this, one should first and foremost do away with argumentative methods.

The second, less radical approach is based on the assumption that jurisprudence can be treated as science, provided it applies methods employed in other fields, e.g. mathematics, logic, physics, semiotics, linguistics, etc. This point of view has been shared by analytical schools (mathematical and logical analysis, linguistic analysis, law & economics), exponents of American legal realism who insisted that legal theory must study what is real — *law in*

action as opposed to *law in books*, and, finally, free law school that adopted methods pursued in sociology and social psychology.

According to the third, and last, belief, jurisprudence is fully autonomous, it should not import a methodology of sciences, but rather develop one of its own. This methodological independence was usually underpinned by the ontological argument (Savigny wrote that its independence is derived from the role that law has to fulfil). This, precisely, was the methodological assumption followed by the "historical school", arguably the most popular theory in the history of the field.

It seems self-evident to say that only by adhering to the second of the above-sketched views one can benefit from concepts developed in other fields of science. This position holds that legal methods are of a pluralistic and heteronymous nature:

- pluralistic, since there is no single and proper legal method
- heteronymous, since there is no such thing as an exclusively (autonomous) legal method.

Let us briefly return to the preliminary point, where we provided a distinction of levels of language used in law. If we were to imagine the language of law *sensu largo* designed to formulate propositions regarding legal language, it would be a meta-metalanguage. If one wished to exercise utmost accuracy and demanded further clarity, one would come to the conclusion that part of those methods consider law only as it presents itself on one of those levels. For example, those who espouse the first approach and forsake the method entirely think of law only in terms of the language of law, whereas those subscribing to the third perspective barely touch this ground. One would be therefore right to ask whether those positions must be mutually exclusive.

§ 4. *LOCUS* OF THE ANALYSIS

We can now begin to see where on the "legal map" is the place for linguistic, preferably semiotic, analysis derived from other fields of science. Similarly to linguistic and economic analyses, the one we wish to discuss will be of a metalinguistic nature. Taking note of methodological semblance with linguistic analysis, stemming, however, from completely different traditions. Logically valid classifications of those two methods is rather impossible because they tend to overlap in certain points. For this reason, one first needs to shed some light on the linguistic analysis.

§ 5. LINGUISTIC ANALYSIS

I shall start with an account of themes explored by Herbert Hart in the *Concept of Law*, his *magnum opus* and peak achievement of the school of linguistic analysis. Concepts are open by nature. This means that each concept has a "core of determinate meaning" and "penumbra of determinacy," or semantic shadow. If so, there may arise doubts whether some objects fall under the given concept or not. In such cases it is futile to attempt to provide its definition — understood in a classical vein as indication of the properties sufficient for ascribing certain names to the object — since it must lead to a "sharpening" of the defined concept, followed by a false depiction of the manner in which the concept is used in ordinary language.

This anti-definitionism does not mean, says Hart, that we must necessarily be ignorant when it comes to concepts embedded in ordinary language. To the contrary, primacy of the ordinary language allows for highly refined analyses of concepts and their mutual relations; the end result cannot be a simple, straightforward definition. In *The Concept of* Law, Hart explicitly states: "This book is offered as an elucidation of the *concept* of law, rather than a definition of 'law' which might naturally be expected to provide a rule or rules for the use of these expressions" (Hart 1994: 213).

Hart's point of departure is a criticism of the definition of law given by the nineteenth-century English philosopher John Austin,[1] often simplified to the following slogan: "law is a command backed by threat." This paper does not purport to discuss Hart's ideas at length, but to advance with our study we shall need to present Hart's linguistic method in action, as he refutes the above-quoted definition. Pondering on situations when it seems fit to use the word "imperative", Hart writes:

> It is that illustrated by the case of the gunman who says to the bank clerk, 'Hand over the money or I will shoot.' Its distinctive feature which leads us to speak of the gunman *ordering* not merely *asking*, still less *pleading with* the clerk to hand over the money, is that, to secure compliance with his expressed wishes, the speaker threatens to do something which a normal man would regard as harmful or unpleasant, and renders keeping the money a substantially less eligible course of conduct for the clerk. If the gunman succeeds, we would describe him as having *coerced* the clerk, and the clerk as in

[1] John Austin (1790-1859) — English lawyer and philosopher, disciple of John Stuart Mill; professor of jurisprudence at the University College, London; one of the founders of legal positivism; considered father of modern jurisprudence; author of *The Province of Jurisprudence Determined* (1832), *Lectures on Jurisprudence or the Philosophy of Positive Law* (1863).

that sense being in the gunman's power. Many nice linguistic questions may arise over such cases: we might properly say that the gunman *ordered* the clerk to hand over the money and that the clerk obeyed, but it would be somewhat misleading to say that the gunman *gave an order* to the clerk to hand it over, since this rather military-sounding phrase suggests some right or authority to give orders not present in our case. It would, however, be quite natural to say that the gunman gave an order to his henchmen to guard the door (Hart 1994: 19).

This fragment is a classic example of reasoning that proponent of linguistic analysis in law would provide. It produces a simple counter-example to the Austinian definition. When the gunman says "Hand over the money or I will shoot," his utterance can certainly be described as a command backed by threat but we would be reluctant to call it an "order," much less the "law." In this fashion, by evoking the heterogeneity of language, Hart shows that the definition prevailing in positive law oversimplifies the word "law" as it is pictured in ordinary language.

Another example of practical application of linguistic analysis also centres on the critique of the Austinian definition, but targets its other part, namely the "threat." In the Polish Civil Code, the concept of will is introduced by arts. 941 and 942, which are in any case perceived as legal norms. Since we do not hesitate to treat them so — and as such they have nothing in common with general and universally obeyed commands backed by threats — we arrive at another example in how to falsify Austinian definition by the means of ordinary language. Let us supply Hart's observation with one comment, namely that such analysis can be successfully applied to any power-conferring rule.

These, of course, are only examples. Hart never settles with exposing Austin's flaws, but further investigates the concept of law by clarifying such distinctions. This, however, goes beyond the topic we wish to pursue in this paper.

To summarise, one may state that Hart's primary linguistic method (standard case reasoning and the method of presupposition were omitted here) is informed by the broad guiding principle that goes like this: make hypotheses regarding the problem you are absorbed with, and test them against examples inspired by how expressions intuitively function in the ordinary linguistic practice.

§ 6. CONCEPTUAL CONSIDERATIONS DEVELOPED IN OTHER FIELDS VS. THE ANALYSIS OF LEGAL

LANGUAGE — BASED ON THE WORKS OF TADEUSZ KOTARBIŃSKI

One handy academic principle has it that theory without examples resembles religion without acts of piety. Happy to oblige, I shall start this paragraph with an analysis of the word "act" by comparing its understanding in the theory of criminal law with the meaning of the term provided in the writings of Tadeusz Kotarbiński, most notably in the *Praxiology. An introduction to the science of efficient action*. We shall conclude the essay with a vocabulary of concepts developed by the author of *Gnosiology* that also lawyers may find useful in their practice.

The first issue that begs resolving is as follows: is really the definition of the word "act" provided in penal code (language of law) and explored in legal theory (legal language) of critical importance?

Analysis of the statutory use of the word should start with retrieving the art.1 § 1 of the penal code that provides the general definition of crime. It is phrased in a way suggesting that establishing the meaning of the word "act" is important for penal liability. By definition, what is not an "act," cannot be a crime. In this view, act, on par with guilt, unlawfulness and social consequences, also laid down in this article, is treated as an actual and independent premise for ascribing penal liability. Note that it is also the most fundamental premise of all, since one must first consider whether the factual circumstances contain any acts at all. It is only after this that one can discuss its unlawfulness and ascribe guilt.

One can tackle the issue from yet another angle (in our tripartite classification of methodological perspectives, this approach follows the first one): if one defines "act" so broadly that it effectively includes any human action and inactivity, or one drops the definition altogether, the word is transformed into some sort of a picklock, put in the article for no other reason, but stylistic. This conclusion could be supported by the purely grammatical argument, since art. 1 of the penal code is phrased in an indicative form: "Penal liability shall be incurred only by a person who commits an act . . . " Here, "act" is merely an object of the sentence. Since one used that verb "commit," one needs to provide an object to satisfy the requirements of Polish grammar. If we were to follow this interpretation, this provision would mean: "penal liability shall be incurred only by a person committing anything that poses a risk to society", and could have precisely this, or equivalent, wording. It would be even clearer if the word "act" was replaced — as proposed by professor Cieślak, among others — with an expression "occurrence of factual

circumstances having features of a prohibited act" (Konieczniak 2002: 14). When deciding whether the "occurrence" took place, one would each time simply cite the specific statutory type of a prohibited act — but the latter would not have to refer to any voluntary activity, not to mention human activity.

For this reason, the word "act" is usually understood as an activity meeting some other additional criteria introduced to grasp the meaning of the concept. For instance, there exists a requirement that the activity in question satisfied certain mental aspects, namely that it was undertaken when it could have been abandoned or different.

Reading of the commentaries on the legal order in force (1997 Penal Code) may result in the conviction that an act is only perceived as human movement (or lack thereof) originating in the wake of some internal impulse. Someone whose movements are beyond one's control, even if one's consciousness functions properly (e.g. when thrown by force through the window), manifests one's impulses to the degree of a falling stone, hence in this respect we cannot speak of an act. Note that it can by no means be tantamount to a situation where the activity arose due to some mental state, which however is abnormal and gives no basis for accusation (e.g. the perpetrator is mentally ill). One should therefore differentiate between those concepts, contrary to some authors (professor Kubicki, for example) who would like to remove "act" from the conceptual framework of criminal law. Bearing this in mind, it is worth taking a leaf from professor Zoll's book. There is no doubt that he means "act" as a theoretical concept when he writes: "the concept of act plays a crucial role in constraining lawmaker's powers. It effectively prevents certain types of crimes from being included in the legislative acts unless they fall under the concept of act" (Konieczniak 2002: 19).

Let us now reconstruct the concept of "act" found in the writings of Tadeusz Kotarbiński (most notably in the *Praxiology. An introduction to the science of efficient action*). In his view, the main task of praxiology is to "formulate the most general and most efficient norms" (Kotarbiński 1975: 15). For this reason, determining meanings of concepts was for him extremely important. He addressed the criticism accusing praxeology of being truistic and trivial by underscoring substantial benefits to be derived from the construction of such vocabulary: "What is the use of such vocabulary? It can contribute to the reduction of ambiguity and misunderstandings that may arise from it [...] One cannot forget that language not only assists but guides us, and we need to watch over it, since it sometimes tends to

lead us astray" (Kotarbiński 1975: 155-160) In *Praxiology...*, Kotarbiński, after a great deal of meticulous reasoning backed by multiple examples, delivers the following definition: "To act — or at least act on reflection — means to change reality in more or less a conscious manner; to strive for a definite goal under given conditions by appropriate means in order to pass from existing conditions to conditions corresponding with the adopted goal" (Kotarbiński 1965: 10). It follows that in order to be considered an agent, one must act on a voluntary impulse being the cause of the given act. Due to some persistent regularity of the sequence of events, the cause is by necessity a certain change that is an essential element of the sufficient condition of the given act. And an essential element of the sufficient condition is an element that, if missing, would render the system of remaining component events unable to function as the sufficient condition (Kotarbiński 1965: 14-15).

In any case, the end result of those two necessarily superficial, because only illustrative, analyses is identical. In other words, both definitions, whether provided by Kotarbiński or contemporary theory of criminal law, offer the same meaning of the term "act". This, however, is not of prime concern, since it is the method that interests us most. I am not entirely sure if it can be regarded as some sort of semantic analysis, or whether even it is any method at all. This is because it largely consists of the systematisation of legal language, an operation much opposed to the undertakings of the Oxford school represented by Hart. Linguistic analysis examined different contexts of meaning to develop the so-called social theory of law (grounded in the conviction that various social institutions are established through performative function of law). Meanwhile, the analysis proposed here would start with a comparison of various meanings of legal terms, and arrive at definitions systematising those meanings. This process produces concepts that form conceptual frameworks of jurisprudence.

The writings of Tadeusz Kotarbiński contain many other conceptual considerations that lawyers should reflect on. To name but a few:

- AGENT OF THE GIVEN ACT — one whose free (i.e. voluntary-dependent) impulse is the cause of the given act.

- VOLUNTARITY is a specific feature of the intentional activity, not some indeterministic freedom of choice understood as independence from causes.

- CAUSE — a change that is an essential element of the sufficient condition of the given act originating due to some natural regularity

in the sequence of events.

- ESSENTIAL ELEMENT OF THE SUFFICIENT CONDITION is an element that, if missing, would render the system of remaining component events unable to function as the sufficient condition.

- SUFFICIENT CONDITION is a system of earlier events of some later event, with respect to a given law of a sequence of events, and with respect to the time segment filled simultaneously by all the component events of that system.

- EFFECT — the event B is an effect of the earlier change A, that filled the moment t; and the change A is the cause of the sufficient condition of the event B with respect to the moment t, and with respect to some natural regularity in the sequence of events.

- RESULT — any effect.

- GOAL — the given event is a goal of the agent acting on a voluntary impulse if, and only if, the effort was made to cause this event.

- POSSIBILITY — ability to act, may be divided into

- INTERNAL POSSIBILITY, i.e. dispositional

- EXTERNAL POSSIBILITY, i.e. situational.

- MUST — in a logical sense it means that negation of such and such would not be in line with the assumptions made (for example, if I assume that if X does something, he acts, and if X does not do anything, he acts as well, therefore X MUST act in a logical sense).

§ 7. CONCLUSION

In conclusion, it seems right to ask what the odds are for spreading the proposed analysis throughout legal practice. One is prone to the suspicion that, however useful it may be for the individuals practicing it, it will nevertheless fail to find broader application. Owing to an increasing specialization of law, it is difficult to fix the meaning of a concept that all specific fields of law would agree upon. Most frequently, one would come to the conclusion that such and such jurisprudential concepts function in a variety of meanings, with no perspective for leaving this conceptual quagmire anytime soon. Or

that a dozen of respected authors perceive certain legal concepts differently, but all share one vaguely occurring thread. No wonder that jurisprudence displays little enthusiasm for such a state of affairs (Ziembiński 1985: 337). It appears that among those who will be better off with it will be those who practice law themselves.

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KRIPKE-PUTNAM SEMANTICS AND THE LANGUAGE OF LAW

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INTRODUCTION

This article offers a critical assessment of a legal method of applying law traditionally referred to as formalism. By and large, formalism rigidly follows the letter of the law, even if the outcome is unjust or at odds with common sense. Although this is widely believed to be in line with the idea of positive law, i.e. that instituted by human beings (as opposed to, e.g. an absolute being, as in natural law), it is possible to challenge formalism by manifesting its incompatibility with core ideas of legal positivism and the rule of law. At the same time, an alternative method for the application of law is available, one that does justice to those core ideas. This non-formalistic method is based on sematic analysis of legal text. Similarly to formalism, it effectively secures the predictability and stability of law while limiting the influence of an individual's preferences on the outcome of the interpretive process (constrains legal discretion).

Legal formalism is not a purely theoretical construct but one constantly intertwined with our daily lives. We encounter it while pursuing actions in courts or authorities and often experience disappointment when faced by specific, formalistic rationality of bureaucratic *modus operandi*. This disappointment is fueled by frustration when our case is seemingly decided contrary to common sense. Such decisions, we are often told, are dictated by the so-called letter of the law, an approach which disenchants those people dealing with courts or authorities who expect their decisions to be dictated by justice. Disenchantment with formalism has a long lineage: a

Florentine law of the Middle Ages forbidding "the spilling of blood on the street," passed originally to prevent mayhem, resulted in the prosecution of a medic who blood-let a gravely ill patient who was lying there.

Indeed, as far back as 1BC Cicero occasioned the legal maxim *Summum ius summa injuria*, "The highest law, the highest injustice" (Cicero 2008, I, 10, 33): rulings rigidly sticking to the letter of the law often have little to do with justice. Why is that? Not necessarily as a result of error or malice on the part of the decision maker: serious arguments support the application of formalism in the decision of legal issues. These arguments include enhancing the predictability and stability of law, and curtailing judicial discretion.

Arguments of this sort lead formalists to claim that a judge's role is not to implement justice but to let the law speak for itself, without correcting it, even if it produces worse results than common sense would prescribe. In line with this position, formalists maintain that an optimal legal procedure entails:

1. syllogistic application of law, i.e. a mechanical procedure where premises produce conclusions ("premises" being, e.g. factual circumstances or clear legal texts, with "conclusion" understood as an individual and specific norm);

2. reduction of the number of interpretive premises guiding the legal decision, manifest in:

3. a refusal to factor in values of legal culture other than the text and the original intent of the legislator (this includes, *inter alia*, no consent for legal term's meaning changing over time),

4. a refusal to factor in general principles of law (standards), application of which requires an expression of values; this manifestation of reductionism regarding interpretive premises often gives priority to the "most locally applicable rule" when deciding the case at hand (Schauer 1991: 188).

Notwithstanding its numerous supporting arguments, the formalistic approach is fundamentally flawed. The primary reason is not merely that rulings adhering to formalistic methods are unjust; rather, they cannot be reconciled with the positivistic idea of law. One of the arguments supporting this claim has it that a formalistic application of law disregards semantic, syntactic and pragmatic features of legal language.

This paper is dedicated to semantic features of legal language, and employs Kripke-Putnam semantics. It concludes that formalism cannot be reconciled with legal positivism because the nature of legal language requires interpretation that:

1. is not syllogistic,
2. does not reduce the scope of interpretive premises to the acontextual meaning of the text of law and original intent of the text's author,
3. takes into account the general principle of law and acknowledges that the meaning of legal text changes over time.

THE POSITIVISTIC APPROACH TO LAW AND THE LANGUAGE OF LAW

A positivistic approach to law embraces the view that rules, norms or standards that are law can be distinguished in social practice from other rules, norms or standards that are of a different nature (customs or morals, for example). To make such a distinction one resorts to the test of pedigree that evaluates the given rule norm or standard by application of certain criteria; if the test is passed, the norms or standards are included into law. In the positivistic stance, the test of pedigree ultimately rests on the authority of the legislator. Thus positivism acknowledges as law those rules, norms or standards that are established by the legislative authority recognised in a given community. Building on this self-evident conclusion, one may assert that recognising some rule, norm or standard requires the act of their establishment to be somehow acknowledged. Acknowledgement of this act may only be possible when the legislative authority has communicated the act in a public manner. To this end, the positivistic legislative authority must use language that is intelligible for the addressees of law. Ultimately, the positivistic understanding of law hinges on language; this distinguishes it from other positions, particularly the school of natural law, which is inclined to recognize law through other methods than linguistic ones. As it is, the test of pedigree can be applied only to rules, norms or standards expressed in language. Only in this form can they be tangible enough to be judged whether they belong to the legal system or other normative regimes, most notably morals.

The linguistic character of law, being the predominant feature of positivism, enables the cognition of law through the language used by the

lawmaker. Such language usually undergoes a three-stage analysis — of a semantic, syntactic and pragmatic nature — understood, respectively, as an analysis of the meaning of names used in language, an analysis of the structure of complex messages conveyed in language (e.g. sentences, or, in the case of law, norms), and an analysis of the manner and context in which names are used. Let me first focus on the semantics of legal language before moving on to its syntactic and pragmatic aspects. My goal is to demonstrate that as a method of interpretation and application of law, legal formalism fails to correspond with any of the aforementioned aspects of the language of law.

MEANING OF THE TEXT OF LAW AND THE TIME-GAP EMERGING BETWEEN ITS ENACTMENT AND INTERPRETATION

I assume that, when applying the test of pedigree to certain messages formulated by the legislator, the lawyer embarks on a semantic analysis, i.e. determines their meaning. There arises the question as to the type of sematic analysis one should follow. Here, I have two specific issues in mind. First, which theory of meaning is applied by the lawyer when he analyzes the text of law, including the manner of reference he adopts when determining how legal terms correspond with the extra-linguistic reality. Secondly, I am interested in the temporal aspect of interpretation, namely the moment for which the lawyer fixes the meaning and reference.

The first question can be approached in two ways. The first, based on the intentional (associationist) theory of meaning (Ajdukiewicz 1978: 1-34), assumes that the meaning and reference of legal terms are contingent upon the intent of the speaker - in the case of law, the legislator. In this approach (let us call it INTENTIONAL SEMANTICS), the author of the legal text by uttering words intends to refer to certain specific elements of an extra-linguistic reality. The task of the interpreter is to identify this intent, determine the content of names used by the author and identify designations of the extra-linguistic reality, i.e. things, human beings and circumstances that meet the criteria making up the content of names put by the legislator in the text. The second approach to meaning, (K-P semantics, named after Saul Kripke and Hilary Putnam), departs from the intentional theory towards a causal theory of reference that declares that "meanings just ain't in the head" (Putnam 1975: 215-271). In its quest for meaning, K-P semantics abandons the intent of the speaker and turns to usage of specific names in social practice, which — owing to an enduring tradition of

standard usage of terms — controls which objects and situations occurring in the extra-linguistic reality are referenced.

Intentional semantics disguises the flaws of formalism, allowing as it does the claim that the main goal of the interpreter is to discover the intent of the text's author. This interpretive strategy justifies originalism, and is very much ingrained in both the old formalism and the modern version preferred by some contemporary interpreters of the US Constitution. At the same time, a focus on the actions of the historical author — rather than on the author's communicative community — puts the major issue out of the picture, namely that of the text's persistence in time. This latter was described by Ricoeur as the text's detachment from the author and the subsequent distancing of the author and the reader (Ricoeur 1976: 49-50), and is a feature of critical importance when trying to grasp the nature of the language of law. By ignoring the phenomena described by Ricoeur, intentional semantics, especially in law, provided apparently solid foundations for formalism. Those same foundations collapse when challenged by K-P semantics. As described below, the K-P framework shifts the focus away from the author and focuses on his words and the linguistic practice of the communicative community that created and interprets the text, as well as the reality referenced within (Brian Bix 2003). Since between the moment of origin and the moment of interpretation of the text there usually is some temporal difference, K-P semantics challenges the interpreter much more forcefully than intentional semantics. It does so to investigate which linguistic practice and which extra-linguistic reality referenced in the text one should be inclined to choose: those prevailing at the time the text came into being or those prevailing at the time of its interpretation.

The above-outlined reasons make one issue stand out from among the many that can be examined in the framework of semantic analysis, namely how the interpreter copes with the ever-present temporal shifts of meaning in law.[1] The older formalistic stance favours meaning as prescribed by the original lawmaker, available only when unearthed through historical reconstruction of circumstances in which the given text of law was issued. This approach in fact advocated originalism, which provides two ways of arriving at the binding meaning of the text: by consulting the intent of the historical legislator or by establishing the usual meaning of the interpreted text ascribed to it in the moment the text was created. That "usual meaning" is a shared meaning in the given time frame or the meaning adopted by

[1]Regarding the need to find the temporal consistency of meaning and problems related with this enterprise, see Mark Tushnet (1983).

the rational reader and participant in the communicative community at the moment the interpreted legal text was created.[2] The latter is closer to K-P semantics, since it shifts focus from the author to the communicative community in which it functions.

Contrary to the old formalism, currents identified as new formalism seem to give priority to the meaning of the legal text that is shared at the moment of the text's interpretation, not its creation (Eskridge 1990: 667). They discard originalism and the intent of the historical legislator in favour of the meaning of the text of law that is not fixed by the historical lawmaker, but is adopted by the rational reader participating in the communicative community of the interpreter. At the same time, more dissonance is brought to formalistic stances by adherents of the new formalism (such as Antonin Scalia) who apply to interpreter-friendly tests when construing statutes, but champion originalism when interpreting the Constitution.

Recently, formalists like to emphasise that meaning of the given linguistic message identified as an element of law is accessible through a simple act of perception allowing one to grasp the "plain meaning" (D'Amato 1991, passim; Ross 1995, passim). Such analysis means that the interpreter understands the text as it is comprehended in his time by his community. But what does "plain" meaning actually mean? Plainness should be understood as something obvious and therefore commonly shared, this, in turn, can be considered only in relation to some social group. It appears, then, that in search of the plain meaning of the text, the interpreter establishes not its objective, timeless meaning (it seems that such a thing does not exist), but rather meaning as it is fixed at the point in time and space of the interpretive process (one commonly accepted in the community the interpreters belong to). Needless to say, the term or more complex message can have a meaning different from the one it had at the moment the legal authority introduced it to the given community, the more so if much time has elapsed since the rule, norm or standard was established.

Now, can it be assumed that by determining the "plain" meaning of the term or legal message the lawyer in fact "updates" the meaning — thus changing it when compared to the one prescribed by the legislator? In other words, does the lawyer effectively embark on a dynamic interpretation when trying to find "plain" meaning? It appears to be too early to answer this question (I believe this will be possible in the closing paragraphs of the subsequent part of this paper). There is no doubt that within formalism

[2]Regarding differences between the old formalism and new formalism (textualism), see William Eskridge Jr. (1990).

itself there is some confusion where meaning should be deemed binding — the original meaning, stemming from the legal authority, or the common (plain) one prevailing in the community of the interpreter?

Both of the above-indicated conceptions of meaning of legal texts is supported by core assumptions of formalism, i.e. the syllogistic character of the interpretive premises and the desire to reduce their number. Both conceptions of meaning are also dogmatic in their rigid use of the chosen premise or set of premises while disregarding others that would be equally applicable in the given case. Originalism prioritises meaning specified at the moment of enactment, thus putting the evolution of meaning over time in a blind spot. When employed, such reasoning ignores a range of interpretive arguments, collectively termed "dynamic theories of legal interpretation." On the other hand, new formalism takes into consideration the meaning of the legal text as it presented itself at the moment of interpretation, turning a blind eye to the original meaning and the intent of the lawmaker. Additionally, formalistic attempts to capture the plain meaning are highly syllogistic: the interpreter does not need to justify the rationale for accepting "plain" meaning because the interpretive process is intuitive and automated.

The choice of either of the above positions notwithstanding, we must concede that they seek to anchor their claims in the text of law. This is not the case with anti-formalistic schools, which, whenever proposing sematic analysis of the language of law unburdened by originalism or "plain meaning," tend to depart from the legal text itself. This may prompt harsh responses from the more traditional and legalism-oriented members of the legal profession. One example of such an anti-formalistic approach is the dynamic statutory interpretation offered by William Eskridge Jr. (see also Wróblewski 1959: 159). He identifies three perspectives of legal interpretation: a textual perspective, where interpretation is focused on formal aspects, constraining available interpretive options; a historical perspective, which gives priority to expectations of the historical legislator; and an evolutive perspective that factors in the change within the context in which the statutory act is embedded, specifically the social and legal environment as it developed in the time spanning its enactment and the moment of interpretation. This distinction explicitly splits the textual from the evolutive perspective. This would mean that dynamic interpretation cannot be based on the text. Eskridge can be seen to confirm this elsewhere in his paper, when he compares the evolutive perspective with the textual one, commenting that the former should in certain cases be preferred over the latter (Eskridge 1987, passim).

One can regard the position held by Eskridge as a standard example anti-formalism, which constantly dwells on the evolutive argument and never ceases to demand the incorporation of change in external circumstances into the process of interpretation, while at the same time conceding that such an approach cannot be inferred from the text of law. Such a position seems to undermine its own legitimacy. Departing from the text of law is universally associated with unconstrained discretion and regarded as a threat to the supremacy of legislative authority. It appears that it is one of the reasons why an evolutive critique of formalism does not enjoy much currency and never succeeded in unseating its position in the judiciary.

A different approaches to legal interpretation is possible, one that assumes that, to employ Eskridge's terminology, textual and evolutive perspectives are not conflicting ones, but complementary. More recent semantic theories allow us to recognise that the meaning of terms contained in a text changes over time. This approach imposes multiple obligations on the interpreter. He may no longer authoritatively state that the original — "plain" — meaning is the only valid one. Instead, analysis of the text must be informed by a larger number of interpretive premises.

To this end, I apply K-P semantics to the text of law with the purpose of justifying anti-syllogistic and anti-reductionistic claims. Two assertions underlie my approach. 1). The text of law can have up to several meanings depending on the moment in or for which one tries to determine it. One of those meanings can be original, fit for the moment of enactment, with the other fit for the moment of interpretation. This assertion backs the anti-reductionistic claim, as it refutes the dogmatic standpoint that there is only one original meaning, with others deserving to be passed over. 2). In order to determine any meaning from the text, one needs to learn how the terms used therein function in practice at the moment that is of interest to the interpreter, be it the moment of enactment or any other point in time in which the text remained incorporated in the legal system. Subsequent meanings of the text can be elucidated through, *inter alia*, analysis of the same term occurring in other statements that originated at the same time. Here, documents produced as a part of legislative history come into play (Eskridge 1987: 1484), i.e. writings regarding matters regulated in the given act — assisting its enactment — opinions expressed by jurisprudence, or in comparative legal studies, etc. The second assertion supports the anti-syllogistic claim. It indicates that legal interpretation is a complex process — having little to do with a simple logical operation — that seeks to arrive at meaning via analysis of much "evidence" that supports a particular

understanding of the term.

In effect, considerations provided in this part will lead to the conclusion that formalistic claims regarding the syllogistic nature of interpretation and the necessary reduction in number of interpretive premises cannot satisfy their descriptive or normative ambitions. As regards the former, they fail to deliver on promises because they paint an inaccurate picture of the interpretive process. They also fall flat as normative claims because they lead to grave and unjustified oversimplifications of interpretation, resulting in incorrect conclusions, understood here as an incorrect meaning of the text of law.

An attack on this sort of reductionism and syllogism-based legal reasoning is a necessarily destructive step in the critique of formalism. The critique also has a constructive purpose: to show that an evolutive perspective is inherently connected with the linguistic one. I will assert that the interpretation based on evolutive premises is compatible with legal positivism and conclude that the linguistic nature of law entails dynamic interpretation rather than excludes it.

KRIPKE-PUTNAM SEMANTICS AND THE LANGUAGE OF LAW

Formalistic interpretation and application of law is based on traditional semantics, which essentially focuses on the user of the language, his thoughts and behaviour. This approach underweighs the context in which the language is used, especially practice in the linguistic community to which the speaker belongs. These elements come into focus with more recent developments in semantics, notably the Kripke-Putnam semantics, which seems better tailored to study the linguistic practice prevailing in the legal world. Its superiority lies in a shift of emphasis from the individual towards the communicative community, coupled with specific objectivisation of interpretation. Traditional semantics views the process of understanding (this includes analysis of provisions or rules) as an operation that:

1. consists in matching extra-linguistic objects with the criteria specified in the content of the name,[3]

[3]This approach to linguistic analysis of legal provisions was criticised by the anti-positivists; the most widely recognised example of this critique is the idea of "semantic sting" formulated by Dworkin (1986).

2. retrieves intent and knowledge of the speaker, i.e. psychological meaning or "speaker's meaning,"[4] and

3. does not focus on the evolution of meaning over time.

In this model, the process of understanding goes through two phases: firstly, one determines criteria referenced in the name used by the speaker (the name's content); secondly, one tries to identify an object that meets those criteria (designation). An underlying assumption is that the speaker's intent controls how the term refers to reality. When the speaker uses a certain term, he has in mind criteria that constitute its meaning; to determine what the speaker refers to, the receiver must identify an object that satisfies those criteria. Note that such an intent and criteria-driven approach suppresses the evolution of meaning (understood as a manner of reference's[5]). For if we concentrate on the speaker's intent and meaning, we have no option but to assume that they not change over time because they are permanently fixed to the speaker and the moment of the utterance. With its intent-, criteria- and determinacy-based approach, traditional semantics is easily reconciled with formalism. As I have indicated in part one, the latter also centers on the intent of the speaking subject (lawmaker), analyses whether the given object (e.g. an element of factual circumstances) satisfies criteria specified in the provision, and denies that the manner of reference may change over time.

The latest papers in legal studies apply contemporary semantic theories to legal language, most notably K-P semantics, labeled so (as indicated earlier) after its makers: Saul Kripke and Hilary Putnam (see Stavropoulos 1996, passim). Those new developments in semantics differ from traditional approaches in a number of ways, as they:

1. deny that in processing meaning, the criteria (the name's content) are determined first and the objects that match these criteria are determined second,

2. dismiss the notion that the speaker's intent and knowledge are necessary to identify the referent; this is so because "conventional meaning"

[4]Of such nature is, for instance, the analysis of "psychological meaning" proposed by Kazimierz Ajdukiewicz (1978:7). On "speaker's meaning" see Devitt (1981: 80).

[5]The conception of meaning as a manner of reference is commonly accepted in semantics, although some define meaning without resorting to the notion of reference. See Wójcicki (1999: 52).

prevails over "speaker's meaning,"[6]

3. stress that what the term refers to may change over time.

The first assumption of K-P semantics questions the traditional notion of content defined as a set of characteristic features attributed to the term's designator that allow one to either classify the given object as a designator of the term or disqualify it if some features are missing (Kripke 1991). Kripke criticises traditional understanding of how the term refers to its designator. He argues that meaning is not constituted by the compliance of the properties of the object that the speaker refers to and those making up the content of the term (so-called cluster-of-properties or -descriptions). To clarify his standpoint, Kripke provides an example where he introduces professor Gödel, known for having proved the incompleteness of arithmetic. Kripke imagines for a moment that it was not Gödel but actually a certain Schmidt who had proved the theorem, but died before he could make his discovery known and his manuscript reached professor Gödel who published it under his own name. Kripke comments that if by Gödel we mean 'the man who proved the incompleteness of arithmetic,' then according to the traditional theory of reference we would be compelled to accept that by saying 'Gödel' we in fact refer to Schmidt. But this is not so — by saying 'Gödel' we nevertheless refer to Gödel. This means, says Kripke, that it is false to believe that for one object to be a designator of a certain term it is required that this object satisfies the majority or even all conditions prescribed in the content. Schmidt, even if he really is 'the man who proved the incompleteness of arithmetic,' can never be a designator of 'Gödel.' With this example, Kripke gives his own account of how terms refer to extra-linguistic objects:

The picture which leads to the cluster-of-descriptions theory (the groundwork of traditional semantic theories — M.M.) is something like this: One is isolated in a room; the entire community of other speakers, everything else, could disappear; and one determines the reference for himself by saying — "By 'Gödel' I shall mean the man, whoever he is, who proved the incompleteness of arithmetic" [...] But that's not what most of us do. Someone, let's say, a baby, is born; his parents call him by a certain name. They talk about him to their friends. Other people meet

[6]This is where K-P semantics diverges from Ajdukiewicz's "psychological meaning" that stood at the core of the theory of legal interpretation offered by Jerzy Wróblewski (1959, passim). On some aspects of links to Ajdukiewicz's theory with K-P semantics, see Wójcicki (1999: 52). Regarding "conventional meaning" see Devitt (1981: 80).

him. Through various sorts of talk the name is spread from link to link as if by a chain. A speaker who is on the far end of this chain, who has heard about, say Richard Feynman, in the market place or elsewhere, may be referring to Richard Feynman even though he can't remember from whom he first heard of Feynman or from whom he had ever heard of Feynman. He knows that Feynman is a famous physicist. A certain passage of communication reaching ultimately to the man himself does reach the speaker. He then is referring to Feynman even though he can't identify him uniquely [...] a chain of communication going back to Feynman himself has been established, by virtue of his membership in a community which passed the name on from link to link, not by a ceremony that he makes in private in his study: "By 'Feynman' I shall mean the man who did such and such and such and such" (Kripke 1991: 91-92).

Kripke's semantics, called the causal theory of reference, shifts focus from the intent of the isolated individual to the manner in which the term is used in the communicative community. This opens semantics to what Kripke calls "tradition" of past utterances:

In these cases the reference actually seems to be determined by the fact that the speaker is a member of a community of speakers who use the name. The name has been passed to him by tradition from link to link (Kripke 1991: 106).

M. Devitt, in turn, stresses that:

The central idea of a causal theory of names is that our present uses of a name, say 'Aristotle,' designate the famous Greek philosopher Aristotle, *not* in virtue of the things we (rightly) believe true of him, but in virtue of a causal network stretching back from our uses to the first uses of the name to designate Aristotle. It is in this way that our present uses of the name "borrow the reference" from earlier uses. It is this social mechanism that enables us to designate the same thing by a name. This central idea makes our present uses of a name causally dependent on earlier uses of it (Devitt 1981: 25).

K-P semantics' rejection of criteria-driven analysis — where the object must fit the term's content — is very useful in the critique of formalism. It was due to this aspect of traditional semantics that linguistic analysis was highly syllogistic. Syllogism is particularly visible when one tries to determine whether the designator meets criteria set in the content, especially if said criteria are of a classifying character. By virtue of this, traditional semantics

naturally supports the syllogistic nature of formalism, and paves the way for interpretation and application of law as a subsumption-based process. More recent semantics studies steer clear from such artificial syllogistic reasoning and find meaning by examining the history of linguistic practice followed in the communicative community. Nicos Stavropoulos points out that:

It is precisely the point of the K-P framework that determining the content of a concept is not a mechanical exercise, but is a complex-theoretical-procedure shot through with evaluative judgments (Stavropoulos 1996: 10).

Needless to say, such a perspective makes K-P semantics an excellent tool for proving the anti-syllogistic and, indirectly, anti-reductionistic claims.

The second assumption of K-P semantics offers another shift, from the speaker's meaning to the conventional meaning. This feature is crucial for further considerations, since it paints the picture of language where the subject using the given language (e.g. the language of law) fades into the background, with the utterance pushed to the foreground. This is highlighted by Christopher Hughes in his comment on Kripke's idea of the difference between the speaker's reference and semantic reference:

Suppose you see Smith raking leaves and mistake him for Jones. When you say, 'I see Jones is raking leaves,' the name you use on that occasion refers to Jones. But there is a sense in which you are referring to Smith (though you mistook him for Jones). The speaker's referent is given by a specific intent to refer to a certain individual (in this case, the man raking the leaves); it need not coincide with (in this case, does not coincide with) the semantic referent of the name the speaker uses to refer to the individual she intends to refer to (Hughes 2006: 36).[7]

This shift of focus from the speaker to what is said (thus downgrading the role of speaker's intent in the process of interpretation) undermines originalism, at least where it assumes that the goal of interpretation is to discover the author's intent.[8] It follows that the picture of language preferred in K-P semantics allows critical assessment of the originalism that was so strongly advocated by the old formalism. If adopted, the K-P model for

[7]See also Kripke (1979: 6-27).

[8]See Brian Bix (2003: 287) who criticises semantic theories stemming from Kripke and Putnam for prioritising the „word meaning" at the expense of „speaker's meaning." He finds such an approach at odds with the essential feature of law: the lawmaker's power to change the meaning of words in the legislative process.

identification of objects, to which the speaker refers, means that what one must establish is not the object the speaker had in mind, but the object to which the term refers, basing on "the most coherent explanation of name or term-using practice" (Stavropoulos 1996: 8).[9]

K-P semantics' interest in conventional meaning is also important for other reasons that are essential to the critique of formalism. As I show in the next section, formalism is at fault when focusing on one specific lawmaker. Instead, what needs to be done is to examine the whole legal system, which is a collective enterprise with many contributors. The single-lawmaker approach is best expressed by the preference for the most locally applicable rule (Shauer 1991: 188). The K-P framework explicitly shifts the weight of significance from the speaker to the utterance, thus complying with the idea of interpretive holism (presented below). This shift in principle encourages the interpreter to focus on the legal system (understood as a creation of the lawmaker) not on the lawmaker as such.

The third assumption of K-P semantics, i.e. the change of meaning over time, resonates with the contributions of Gareth Evans (Evans 1996, passim) and Michael Devitt (Devitt 1981, passim) who undertook to develop Kripke's ideas on this matter. For both philosophers two concepts are crucial — "original baptism"(Devitt 1981: 26).[10] introduced by Kripke, and "multiple groundings" based on the idea of designation change over time, touched upon by Evans and introduced by Devitt (Devitt 1981: 138). For Kripke, "original baptism" means the first naming of the object. This first naming consists of description or simple indication (as in his description of the baptism of a child). Evans suggests that it is not only the first naming that is significant for the meaning of the given word; subsequent individuals refer to the object in the causal chain by invoking its name, thus, as it were, grounding its reference. One of the key claims of K-P semantics is that multiple groundings may ultimately lead to the modification of the term's reference. Take the term 'Santa Claus': at first it referred to the bishop, but was later used in other ways and now refers to the alleged deliverer of gifts active around Christmas.

The topic of possible designation change over time followed by new usage of the name is extensively treated by Devitt (Devitt 1981). He suggests that subsequent uses of the term may vary from the original ones, to the

[9] A version of originalism preferring not the original intent of the author, but the meaning of the word as it was understood by the regular user at the time of the utterance will be discussed elsewhere.

[10] He also uses the term "naming ceremony."

degree that at the end of the day the same term refers to another object, or to both at the same time. To quote Devitt:

For there to be designation change, a network originally grounded in one object must become grounded in *another*. To settle whether there is designation change, therefore, we must settle whether or not the object in later groundings is *the same as* that in the earlier ones. The truth values of statements containing the name in question will depend on how we settle this matter. It will often be very hard to settle (Devitt 1981: 151-152).

Designation change, occurring due to the chain of new uses of the term over a long period of time, is the focal point of my interest in K-P semantics. We can assume that, if the original area of application of said semantics, namely proper names and natural kind terms, may be extended to include fields of social practice where one uses theoretical concepts[11] — and law is undeniably such a field – then we may describe legal communication in the manner presented below. When completing an utterance in the language of law (e.g. provision or norm), the lawmaker applies the terms of ordinary language, which, according to K-P semantics, already have a chain of multiple groundings by virtue of being used in linguistic practice of the given communicative community. If this were not the case, communication between the lawmaker and the obligees would be impossible. The language of law is of such character that some of the terms acquire specific legal meaning right at the moment they are incorporated into it, for example by passing legal definitions that modify the ordinary meaning of the word. But mostly, legal terms are adopted from ordinary language as they are, unchanged. With time, terms used to express law gain an increasing number of groundings both in the domain of ordinary language and the domain of legal language. This is so because the communicative community uses those terms while referring to the reality in which it functions. But we need to make a clear distinction between these two areas where legal terms are grounded. Ordinary language is the first and most natural area. Here, members participating in the communicative community use legally charged terms that may be fairly unambiguous — such as ”red” in the description of traffic lights — terms that may be ambiguous (e.g. ”vehicle”), or terms that are completely vague or evaluative, such as ”cruel punishment” or ”good practice.” As regards the first kind of terms, we may say

[11]The scope of this paper prevents me from proving the validity of the assumption made. However, viability to extend K-P semantics to cover concepts other than proper names or natural terms has been demonstrated in the oft-quoted works of Nicos Stavropoulos (1996: 67-68) where he treats at length K-P semantics' relevance for the language of law, and Michael Devitt (1981: 199) who suggests that causal theory of reference can be applied to other terms than names and natural terms, for example to theoretical concepts.

that in principle their reference is fixed and does not change over time. In the case of the other two, we must at least assume that change over time is possible. Due to technological progress the term "vehicle" may refer to a growing group of objects. Similarly, if there is a chain of subsequent uses of such terms as "cruel punishment" or "equal treatment" or "good practice," elements of the reality (e.g. situations or factual circumstances) that these terms refer to may be prone to change. Now, multiple groundings happening in the domain of law are in this context crucial. I believe that legal discourse is not furnished differently than discourse happening in the ordinary language of the communicative community. Be it the notion of "ownership," "excessive burden" or "economic purpose of right," the legal world must deal with their multiple groundings. In legal discourse, court's rulings and administrative decisions are also examples of multiple groundings. Opinions expressed in legal doctrine also belong here, as lawyers employ legal terms and refer them to reality, and by doing so they effectively contribute to the above-outlined designation shift.

As I have hinted above, multiple groundings may lead to designation change. Therefore, (to repeat Devitt) any interpreter, but most specifically the interpreter of law, faces a hard task: settling whether use of the term did not change the designation of the term, be it object, situation or factual circumstances to which the term refers.[12] This prompts a question: how do lawyers determine whether a semantic change occurred in the temporal gap between the enactment of the text and its interpretation, and if it did how does it affect the ensuing interpretive decision?

METHODS FOR DETERMINING SUBSEQUENT MEANINGS OF LEGAL TEXTS AS THEY PRESENT THEMELVES AT A GIVEN POINT IN TIME

K-P semantics' claim that meanings may vary over time is of special importance when attacking formalism from legal positivistic positions. As I have stressed earlier, it is precisely "old-school" formalists who focus on the intent

[12]The test of whether the text has changed its meaning over time plays a role in hermeneutic

"updating" of meaning through understanding, a subject elaborated by Hans-Georg Gadamer (2004) and Paul Ricoeur (1976: 49-50). In legal studies, the constant flux between the present and the past that constitutes interpretation is tackled by Aharon Barak: "Although the text was created in the past, the questions to which it responds are in the present. It is a dialogue that has both static and dynamic aspects. Sometimes, a text carries meanings that its author did not anticipate and of which he or she was not aware. The dialogue between the text and the interpreter is never-ending [...] The text does not speak for itself. It responds to the questions that the interpreter asks of it. Such questions are external to the text. They are products of the present, and they are linked to our ability to understand the text in the present, against the backdrop of the past" (Barak 2005: 57-58).

of the original lawmaker and deny any changes to the meaning of legal terms that may arise over the time elapsed from their enactment to the moment of application. K-P semantics makes it clear that the analysis of legal terms need not depend entirely on a textual perspective. Linguistic approaches to provisions and rules of law is not at odds with the examination of how they sit within the social context and traditional use of legal terms, both before the enactment and later, at the moment the text of law is applied (interpreted). This is enabled by the aforementioned multiple groundings happening in the discourses of ordinary and legal languages. It seems plausible that this particular feature of K-P semantics opens up legal interpretation to new perspectives reaching beyond simple textual analysis that strives to limit the number of interpretive premises and disregards linguistic and extra-linguistic contexts. K-P semantics renders such acontextual interpretation untenable because the latter fails to determine the meaning of the text of law. The determination is only possible after examination of the chain of multiple groundings, i.e. the manner in which members of the given communicative community refer certain terms to reality. Formalist reductionism should be replaced with an analysis of legal language that takes into account any use of a legal term, for instance:

a) pre-legislative and legislative history of the act (social context of language usage at the moment of enactment and later).

In view of K-P semantics, utterances referring to the legal act[13] and contained in legislative texts (utterances concerning the scope of matters regulated in the act, social issues that were to be remedied by the legal act, to name but a few) can be treated as concurrent uses of terms that are the same as or similar to terms occurring in the text of law. In this way, analysis of pre-legislative history never loses its linguistic character, but merely tries to render the meaning of the text of law more accurate by scanning this sort of "comparative material," thus further elucidating the manner of reference of specific terms employed by the text of law.

b) persuasive precedents and legal opinions.

Similarly to legislative history, precedents may be conceived as a source of other uses of the terms occurring in the legal text; their reading may therefore be understood as an attempt to determine the term's meaning. In the case of precedents established prior to or concurrently with the legal text, the term's usage in the former creates the context for the latter. Rulings issued after the enactment spawn further multiple groundings and may be used to determine

[13]The fact that legislative history is in the first place accessible through linguistic utterances (reports of parliamentary committees, protocols of plenary sessions, etc.) is often raised in literature (Barak, 2005). In any case, linguistic character of the legislative history and its ensuing ambiguity is regarded as the weakness of the "argument from legislative history," further used to undermine the benefits of incorporating such history to the methods of legal reasoning.

meanings of the terms used in the given piece of legislation. Precedents in legal systems where the *stare decisis* principle does not apply especially support a positivistic critique of formalism. In the system in question the judge is not obliged to respect past rulings. Nevertheless he still does so, although there is no place in the framework of positivistic reasoning for such an interpretive move because past rulings are not subject to the test of pedigree and do not belong to the law. If we recognize the court's rulings as a source of multiple groundings of the terms contained in the given piece of legislation, we can incorporate a court's rulings to the analysis of legal terms even if the system does not recognise precedents as binding. Multiple groundings exist similarly in legal literature. Although the Polish legal system does not list *communis opinio doctorum* among the sources of law, judges often draw on arguments provided therein. Under K-P semantics, opinions and comments supplied by lawyers can be helpful while determining the meaning of the legal text because they provide another use of legal terms contributed by the members of the given communicative community. However unpositivistic it may appear, K-P semantics manages to present the opinions and comments s an element of linguistic analysis of the text of law.

c)legal comparative analysis

Interpretation can be further informed by the comparative study, i.e. how the examined legal terms function in other legal systems. Such an approach may at face value seem irreconcilable with the positivistic stance. How can legal reasoning or a court's ruling made in a foreign legal system pass the test of pedigree? Formalistic analysis says it cannot, and dismisses this sort of guidance. But, once again, K-P semantics allows us to view comparative studies as an examination of how legal terms function in the given communicative community. Of course, it would now be understood broadly, not only as a community of citizens under a single legal system, but also as a cultural community sharing similar values. Thus, in his comparative undertakings, a Polish lawyer would never consult Islamic laws, but he would be invited to do so with a French or German system as regards civil law or constitutional law, respectively.

To summarise, I believe that legislative history, other judicial rulings, views expressed in legal literature or legal comparative studies, all are perceived by K-P semantics as elements that contribute to the analysis of legal terms. Since they are linguistic in core, their use is justified. An interpretation guided by historical, comparative, or legal literature perspectives goes here hand in glove with positivistic assumptions that provisions and rules are essentially of linguistic character. This, in turn, unseats formalism, along with its textual perspective, as the exclusive method of interpretation available for legal positivism.

All these approaches to the analysis of the text of law focus on the use of legal terms. Some trace the use prevailing at the moment of enactment, others favour use preferred by the interpreter's community over that of the lawmaker.

We therefore face the question as to which meaning is the proper one? Should the interpretive process arrive at original meaning, fixed at the moment of enactment, or should it take into account its evolution in time? The answer to this question can only be given after settling another: Is it possible for both analysis of other judicial rulings or opinions expressed in doctrine (established above as multiple groundings), and analysis of usage prevailing at the time of interpretation, to stay in line with positivism and still take into consideration a change of meaning that emerged in the course of time? What to do when the eighteenth-century framers of the constitution forbid "cruel" punishment? Should the contemporary interpreter apply the term's original meaning or factor in its change over time and include the death penalty under the term? The latter approach is a recurrent theme in legal theory (Eskridge, Frickley 1990 and Barak 2005) but, curiously enough, lacks any justification other than a utilitarian one, let alone justification on the grounds of positivism.

It is difficult to answer the question as to which is the proper meaning based solely on semantic analysis. Followers of the old formalism can respond that change of meaning over time, even if there is any, by no means diminishes the pre-eminence of the original intent of the lawmaker or original meaning of legal terms. They can argue that giving preference to the contemporary meaning of legal terms is nothing other than implementation of the interpreter's, not lawmaker's will. In turn, proponents of the new formalism will put forward a syllogistic claim: if the meaning of the given fragment of the text is clear, then there is no need to consult legislative history, doctrine or comparative studies.

This is why one must introduce one more assumption to refute the formalistic approach, whether based on originalism and advocated by the old formalism, or syllogism-oriented interpretation of the new formalism. Rather than to the semantics of communication between the lawmaker and the rule's addressees, it will refer to its structure, i.e. the syntax and pragmatics of the language of law. The choice between the original meaning and current meaning is not a choice between the will of the lawmaker and that of the interpreter. It is rather a balanced compromise between the original lawmaker and his successors, or, to put it differently, an effort to render coherent the prevailing legal system.

SUMMARY

Jurisprudence can benefit from K-P semantics in a number of ways. First, it is directly linked with the analysis of meaning and may therefore be applied to the linguistic analysis of legal terms; thus, it can support jurisprudential concepts exploring the linguistic character of legal rules. Secondly, Kripke and Putman believe that it is wrong to conceive a name's content as a set of criteria that must be satisfied by the extra-linguistic object before being recognised as a designator of the name. By applying this perspective to the language of law one successfully

avoids Dworkin's "semantic sting." If applied in legal theory, K-P semantics makes it possible to analyze the content of legal terms without resorting to the dubious procedure based on pre-defined criteria. K-P semantics offers a different approach, focused on the use of terms in the given cultural environment. An approach based on K-P semantics takes into account the temporal aspects of law (treated as a collection of linguistic utterances) and their embeddedness in culture and tradition - the two features absent from theories "paralyzed by the semantic sting" (Dworkin 1986: 68). Finally, K-P semantics makes it clear that the meaning of linguistic, and legal, expressions can be fixed without referring to the intent of the individual who uses such expressions, and that the meaning of such expressions can evolve over time. This evolution occurs through "multiple groundings" of the term that follow its "original baptism." The K-P framework sheds new light on legal reasoning that resorts to previous court rulings, (even when not binding in the given legal system), legal doctrine, or legal comparative studies. Arguments derived from all those sources can all guide interpretation of legal terms. They are not excluded from interpretive methods espoused by legal positivism and do not fall prey to formalist reductionism. Instead, they can be embraced by non-formalistic interpretation, which fits the positivistic idea of legal reasoning.[14]

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[14]One may go on to say that K-P semantics lets us build an argumentative vision of law that may not necessarily be of anything other than positivistic pedigree. A different view is proposed in Morawski (1988).

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Jerzy Pelc

THE USE OF EXPRESSIONS VS. THEIR MEANING. PROBLEMS AND DILEMMAS

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Nomina non sunt multiplicanda praeter necessitatem
Władysław Tatarkiewicz

1. THE SURPLUS OF TERMS

To begin with a few remarks on the motto. Scholarly terms are multiplying. I randomly selected a sixteen-page article on the philosophy of language and I found more than one hundred and twenty of them. Two things prove that they are, in fact, terms: their repeated occurrence in the same meaning — sometimes a hardly precise one — and occasionally also their form, for instance "non-truth-conditional meaning." Sometimes they retain their form, but change their meaning, even when they come from the same producer; even more so when they begin to be used by other authors. Conversely, the same contents may be camouflaged under varying forms, i.e. different words. In this case, too, the producer may be one and the same. The phenomenon of terminological surfeit is more than easily discernible in scholarly literature. Take, for example, the *meaning* family: *cognitive meaning*, *contextual meaning*, *context-independent meaning*, *communicative meaning*, *conventional meaning*, *descriptive meaning*, *expression meaning*, *linguistic meaning*, *literal meaning*, *sentence meaning*, *truth-conditional meaning*, *non-truth-conditional meaning*, *use-dependent meaning*, *utterance meaning*, *word meaning*. Each of these terms are used by many authors.

One of the possible reasons for this overabundance of terminology may be advertising — the same mechanism that stimulates taxonomic creativity at dozens of pharmaceutical companies, to which we owe the fact that the same

acetylsalicylic acid, now over a hundred years old, is every now and then being advertised under a new brand name. So, publicity and promotion. The author of a new term rises to the rank of an inventor or a discoverer. Even if the thing in question was already discovered long ago, often several times, each time under a new name. All the "-isms" are particularly rewarding in this respect.

2. THE ACTIONS OF SPEAKERS AND THE FUNCTIONS OF EXPRESSIONS

Let us proceed from the motto of my essay to its title. Abstract nouns which appear in it have been used for the sake of brevity. Further on, however, I will attempt to avoid them as much as possible. This is because I would like to disprove the assumption that I treat the uses and meanings of expressions, as well as the truth, as objects. We hear it said that the usage of some word changes from one occurrence to another, or that this word has this-or-that meaning or this-or-that sense; and we hear it said that something is true or that someone is telling the truth (or not telling it); but all these are substitute expressions. They are convenient because they are brief; but they are also dangerous, because, when occurring in important assertions, they may cause misunderstandings. For this reason, instead of statements containing the word "usage," I prefer statements containing the phrase "I use," instead of the nouns "meaning" or "sense," I prefer the verb "to mean," instead of "the truth" I prefer "true" and "truly."

3. THE DOER, THE ACTION, THE TOOL, THE MATERIAL AND THE PRODUCT

The verb "to use" belongs to the vocabulary of praxeology. In the place L_1 and at the time T_1 the doer, in this case the user, uses some thing or person; he/she makes use of them as tools in order for the circumstances to be so-and-so in the place L_2 and at the time T_2, namely when the doer of the action, while not changing the place of acting, is at the same time the recipient of the resultant product or when the material remains at the same spot throughout the period of time. For example: I comb my hair with a comb (a tool) while standing in front of the mirror, and so I am the doer of the action and at the same time the recipient of the product which results from it, and the place of action remains unchanged. Another example: John is shovelling snow and ice off the pavement, all passers-by benefit from this, the place of action is constant, and the recipients, with the exception of John, are not the same as the doer of the action. I may achieve the same effect while using a variety of tools, for instance I may shave with an electric

shaver or with a razor. The same tool may be used to achieve a variety of products, for instance I may use scissors to cut a piece of string or to pry open the top of a tin. The same product may be obtained by a variety of methods; for instance I may sweeten my coffee by putting sugar into the cup before or after the coffee is poured. It is worthwhile to notice that always, in all the above cases, the tool is a single, concrete object which is used in some way. I stir my coffee with this particular spoon, not with a set of spoons as prescribed by the set theory. And it is not this concrete spoon that stirs my coffee, but I, the user and the doer of the action, am stirring the coffee using this spoon as a tool and using it in a concrete way. In some cases the way I am stirring – clockwise or anticlockwise — does not influence the future product. In other cases, the resultant product depends on the type of tool or the way this tool is used. These banal observations may become useful in the investigation of speech.

4. THE SENDER, THE EXPRESSION, THE RECIPIENT

In the realm of speech, and especially in the realm of conversation, the doer is the sender of a given specimen of a sentence; his partner is the addressee/recipient of the utterance; the communication tool is its specimen, or sample, i.e. a concrete material thing: the vibrating articulation organ of the speaker and the resultant portion of vibrating air, whereas in writing it is a thin layer of ink of paper, shaped so-and-so, or, in other cases, an electronic recording on a disc, diskette or magnetic tape. Not only a dialogue, but a monologue, too, is a type of conversation. In a dialogue, the sender and the recipient of the communication are two different persons; in a monologue, the same person alternates between the roles of the sender and the recipient of the utterance. The change which occurs in the recipient lies in his change from a person who is uninformed as to some issue into a person informed as to it; or his feeling of being called upon to behave or act in a certain way, e.g. to comply with an order, to give an answer, to fulfil a wish — and, in many cases, heeding this call.

We may therefore see the recipient of the communication as a product accomplished by the doer of a semiotic action, i.e. the action of the sender of the communication. Speech and conversation are not the only type of semiosis, i.e. processes in which the tools are signs and the doers and recipients of communications are human beings or, more generally, experiencing subjects. When the communication partners are sentient beings other than humans, they exchange not specimens of sentences, but specimens of other types of signs. Also humans do not always communicate by means of verbal tools; these tools are often substituted by, or complemented with, gestures, facial expressions, postures, i.e. elements of the so-called "body language," or with

the exchange of material goods: money coming from one party, commodity or service coming from the other party. It seems that, in every case, the communication tool either is or can be reduced to a specimen of a sentence.

5. A SENTENCE SPECIMEN AS A TOOL IN SEMIOSIS

Specimens of sentences are used not only in conversations. They are also used to describe or to state something, and to draw conclusions as well. Each of these actions has its doer. Each is directed at a potential or actual recipient. In the former case, i.e. when describing or stating something, we answer questions as to the state of affairs with regard to this-or-that, which are posed by the sender; we convey our answer, of which our partner becomes the recipient. In the latter case, i.e. when drawing conclusions, we turn specimens of sentences into premises and conclusions of lines of reasoning which are intended to convince their recipient (who, in many cases, is the same person as the one who draws the conclusion), explain, confirm or prove something to him. Thus, it is possible to perceive both cases as an exchange of communications between the communicating partners. This view is expressed by the advocates of the dialogic nature of cognitive processes or, more precisely, their verbalisation, and by the proponents of so-called game-theoretical semantics. Thus interpreted, the actions of describing and reasoning have the character of a conversation. According to a different interpretation, they contain not specimens of sentences, but sentence-types, and the context, including the person of the sender, is immaterial.

We shall set aside the cases of semiosis in which there is no sentient sender of the utterance and the interpreter is the only user of the sign (e.g. when on seeing heavy clouds I predict the coming of a thunderstorm) and concentrate on investigating the issues of speech and conversation. Both of them, let us state this again, rely on an exchange of concrete specimens of sentences as meaningful things. The user of this thing "hands it over" to his partner, who receives it, "unpacks" and uses it; then they change roles.

Three issues must be pointed out here: that the exchanged objects are material things, that these things are meaningful, and that the fact that they are meaningful at a given moment does not establish their semiotic nature once and for all — in different circumstances they may lose the function of signs. Quilt covers sewn from canvas obtained from banners discarded by an enemy army are a case in point.

Since during a conversation we exchange sentence specimens (S_e) and not sentence types (S_t), and since they are meaningful things, it is useful to ask what a given sentence specimen (S_e) means, not what the corresponding sentence as a type (S_t) — i.e., according to one of the possible interpretations, the set-theoretical set of those S_e — means. In fact, the phrase: "the sentence

S means this-or-that" is a personification, a substitute abbreviation. A sentence itself neither means nor signifies anything; not does it influence the recipient. All this is done by its users, who use this sentence specimen as a communication tool. This sentence specimen occurs in specific circumstances: it is surrounded by other sentence specimens, which are called its verbal context, somebody sends this specimen and someone else receives it, all this happens at a given time and in a given place, in the presence of other people, things and events — in short, every sentence specimen, like any other thing, occurs in some context: somewhere, someplace, in some situation.

Assuming that semiosis in a conversation relies on the sender's passing on sentences (and by this we mean specimens of sentences, not sentences-as-types) to the recipient, and on passing on names (specimens of names, not names-as-types); and assuming that it does *not* rely on passing on expressions which are neither sentences nor names, and that those names and other expressions are only segments, pieces of passed utterances, several issues emerge.

First, what is a specimen of a sentence, or, more generally, a specimen of an expression, or, still more generally, a specimen of any sign? How does it differ from the type of that of which it is a specimen, i.e. from a sentence as a type, a name as a type and a sign as a type?

Second, assuming that a sentence specimen occurs in a conversation as a semiotic tool, what — to put it briefly — does it mean, i.e. what semiotic actions are performed by its users by means of this tool?

Third, when the users of specimen E_1 of sentence S_1 use this specimen as a semiotic tool, do they perform an identical semiotic action as when they use specimen E_2 of the same sentence S_1?

Fourth, do only sentence specimens have meaning, or do sentence types have it as well? And if both have meaning, what is the difference between the so-called "meaning" of, for example, specimen E_1 of sentence S_1 and the "meaning" of the type of the same sentence S_1?

Fifth, assuming that in semiosis the sentences are tools for communicating, describing and concluding, are only sentences fully meaningful, meaningful "independently" and "by themselves"? I.e., are only sentences categorematic, whereas other expressions, the non-sentential expressions, are syncategorematic, i.e. they bring in their partial input into these semiotic actions which are performed by means of sentence tools, but none of the non-sentential expressions is a tool by means of which a semiotic action can be brought to a conclusion, that is to obtaining its product?

I want to declare in advance that I have not managed to find a satisfactory answer to any of the above questions. "I have not managed to find" means: not only do I not have the answer myself, but also I have not found it in

the writings of others. This is why I have put the warning phrase "problems and dilemmas" in the title of this essay.

6. A SPECIMEN OF A SIGN AND A SIGN AS A TYPE

C. S. Peirce, a perceptive reader of ancient philosophers and their later followers, has proposed three divisions of the concept of sign, or *representamen*. He distinguished three types of signs in each division. In the first trichotomy, he recognised *qualisign*, *sinsign* and *legisign*. A representamen which is a *qualisign* is exclusively a quality (*qualis* — what, *signum* — sign). This quality requires an incarnation; only then can it be used is a sign. A *sinsign* is a singular, actually existing thing or event (*singularis* — singular, *semel* — the one time, once),which becomes a sign due to its qualities, thanks to the incarnation of *qualisigns*. *Legisign* is a law which is a sign (*lego* — collect, assemble, *lex* — law, system, rule). Every conventional sign is a *legisign*, but not every *legisign* is a conventional sign. Every *legisign* is a general type, which should have a meaning, and every singular application of this *legisign* is its replica which is a *sinsign*. "But these are not ordinary Sinsigns, such as are peculiar occurrences that are regarded as significant. Nor would the Replica be significant if it were not for the law which renders it so" (Peirce 1955: 102).

What is still remembered from Peirce's first trichotomy of signs is its most graspable and comprehensible element: the distinction between *sinsign* as a single actually existing thing or event and a *legisign* as a general type. This distinction proved fertile; it lay at the foundation of the distinction of 'type' vs. 'token'. Since, according to Peirce, a *sinsign* could be either a single thing or a single event, in addition to the token there emerged the concept of the occurrence of the sign. However, not everybody understood it in the correct way, i.e. as requiring that a concrete specimen of a given sign (E_{1Z1}) cannot occur more than once and only this once, i.e. in one and only one occurrence (P_1). If another specimen of the same sign (E_{2Z1}) occurs beside it, it will not be the same occurrence, but a different one P_2). The concept of the occurrence of the sign found a reflection in terminology: the term 'sign-event' (sign-as-a-given-event) is sometimes used instead of a 'sign-token', whereas 'sign-design' (signs-as-a-design or model) is used instead of 'sign-type'. The term 'sign-design' seems to echo the ambiguity of the word 'type'. A type is either an empirical or a mentally construed object which has the features which with regard to the selected aspects are most often represented in a given set. Due to this, this object becomes a design or model, it actualises the rule (*lex*, *legisign*), according to which the specimens of the given sign are created, each of them occurring only once and in a single place.

Kazimierz Ajdukiewicz termed the specimens of some word "a word *in concreto*," and the word as a type "a word *in specie*." He completed this by making an additional distinction between words *in specie*: the words *in specie* not defined as to their syntactic position and the words *in specie* defined as to their syntactic position. Thus, the word *in concreto* "stół" (table, nominative) and the word *in concreto* "stołowi" (table, dative) are cases of the same word *in specie* not defined as to its syntactic position, whereas they will be considered to be examples of two different words *in specie* defined as to their syntactic position, i.e. respectively, the words *in specie* "stół" and "stołowi."

The distinction between specimen and type causes problems when it is necessary to determine whether two objects, O_1 and O_2, are specimens of the same sign as type Z_1or, respectively, two different signs-types: Z_1 and Z_2. For instance, I see two "identical-looking" letters, "V" and "V," graphic specimens of some sign as type. On what basis do I decide that these are two specimens of the same sign? Because they are visually "identical." And are the visually "the same" as their original sign-type? It the latter is abstract, it cannot be seen. If, conversely, it is concrete, then it will be just another specimen of this sign, a third one. But which sign precisely: as a type or as a model?

This is not the end of the problems. It is said that this precise inscription of "V" and this concrete utterance of "V" are two specimens, a graphic and an acoustic one, of the same sign as type. Is this assumption based on a deceptive similarity of sensual qualities: the visual appearance and the acoustic appearance? Quite the opposite. Still, one is tempted to consider each of its inscriptions and each case of its being uttered aloud as separate specimens of the same sign as type. In fact, this is the usual practice. On what basis, however?

The same inscription, "V," Jan would read as *ve*, Hans as *fau*, Mary as *vee*, and Pompea perhaps as *quinque* or *quintus*. Can, therefore, a given, singular, concrete object be a specimen of two different signs-types? One would prefer to avoid this, considering that a text printed in this precise specimen of a book never happens to be the text of, for instance, *Hamlet* and *Pan Tadeusz* at the same time. In view of this, I agree that two specimens of "V" and "V" are of the same shape but may have a different meaning. To what are we referring, then? To meaning; to what both each of the specimens of this sign and the sign-type mean. Both? Does each of the specimens of this sign means the same as the other or something different, and "the same" sign as type means still a different thing? This escape from the concrete to the abstract, these references to the concept of meaning, are not satisfactory at all. This is because in order to ascribe a given specimen of a sign to its

proper type of a sign (and not being able to rely on the identicalness of their shape), I would be compelled to declare that they mean the same. In doing this, I would resolve an important issue: that not only specimens of sentences, but also sentences as types have meaning; and if it is so, if the given specimen of sentence S_1 means the same as the type of this sentence, then there is no difference between the so-called contextual meaning of the given utterance of sentence S_1 and the so-called lingual or lexical meaning of the same S_1 outside the context. This particular issue is entangled with other problems and concepts, some of them being truly crucial, and with many misunderstandings.

7. THE PRAGMATIC AND SEMANTIC CONCEPTS OF MEANING

I think that the existence, not only in the Polish language, of synonyms or near-synonyms to the word "meaning" points to the diversity of intuitions associated with this term. Instead of "meaning" we may say "sense" or perhaps "understanding." These words direct our attention towards the feelings of the speakers. *Sensus* is "feeling," "perception" or "awareness;" *sentio* — "I feel," "I perceive." It is human beings who feel, not the names or sentences. It is not the names or sentences that have an understanding; they are understood by people, their users. Thus, "understanding" refers to a pragmatic relation. The case of "interpretation," sometimes used as a synonym to "meaning," is similar; this word, too, is tinted with pragmatics: it evokes an image of a recipient, who explains to himself what thoughts are concealed in expressions. Frege termed the contents of a sentence *Gedanke*, i.e. a thought. He was of the opinion that a sentence expressed a judgement: expressing is a pragmatic relation, whereas the word "judgement," due to its ambiguity ("logical judgement"/"psychological judgement," "judging") may also be associated with a pragmatic relation, namely with the relation of the sender to his statement. Ajdukiewicz wrote that a sentence expressed a judgement and that this function was semantic. It is known from elsewhere, however, that "I assume," "I state," "I ask" etc. are names of propositional stances, i.e. indications of the statement user's pragmatic attitude towards the contents of his statement. Perhaps, then also the choice of this term was partially influenced by pragmatic intuitions. A pragmatic allusion to the communicative intentions of the speaker may perhaps be discerned in Husserl's term "meaning-intention," which is derived from medieval semiotics. It may be so in the case of the etymologically related term "intension" as well. Perhaps only the world "contents" in the sense of the meaning of a word or sentence does not go beyond the language itself; contents is what fills a linguistic form as if it were a vessel. And the term "meaning" itself? Is it possible that this is the only one to have a semantic character? It points

to the thing or event to which it refers. But the origin of the English word "meaning" might indicate the influence of a pragmatic factor, since the verb "to mean" means, among others, "to have something in mind" or "to want to say something" and thus has a pragmatic slant. Today, few scholars write or say that expressions *mean* something. In Polish, the expression "znaczy, że" (= it means that) has been supplanted by the expression "oznacza, że" (= it signifies that) — which, in my opinion, is an erroneous one, or at least one not mentioned in dictionaries — instead of the correct "oznacza coś" (= it signifies something). In semiotics, the relation of signifying, i.e. designating or denoting, is considered to be a different relation or semiotic function than "to mean." "To signify" points to a designate or a scope, whereas "to mean" points to meaning, i.e. sense. Hence, it is not only in the interest of the correctness of our Polish that we should avoid using "oznacza, że" instead of "znaczy, że." At the same time, however, this linguistic and terminological deviation points to a semantic tendency to present the function of meaning as a referential function, probably one associated with the sentence's veracity conditions.

Evidently, the terminology referring to the domain of meaning would indicate that, while defining this function, people think of its pragmatic aspects far more often than of its semantic aspects. Yet meaning together with signifying are most often classified as belonging to the domain of semantics. Perhaps it would be advisable to make a distinction between the semantic variations of meaning and the pragmatic ones, or at least ones rooted in semantics. The first area would include verifiable meaning, closely connected with signification, e.g. meaning as connotation, as construed by Mill or Ajdukiewicz. The relation of an expression to its own connotation is considered to be semantic because it transcends the boundaries of language and reaches the objective reality — objective because the connotation is supposed to consist of features really inherent in things, which are pieces of that reality.

8. THE EXPRESSION VS. THE CONTEXT

Some variations of the meaning of expressions are treated as pragmatic or partially pragmatic not because of the features of terms referring to this meaning. Quite the opposite: it is the character of the terminology that results from the fact that these linguistic expressions are used as tools for performing semiotic actions, acts or deeds (*pragma* means an act or action). These expressions are signs, and each sign is a sign of something. They are linguistic signs, and each such sign is a sign for someone: the sender and the recipient. There are no expressions — and this term includes words as well as phrases, sentences and texts — which do not belong to anyone, which are

ownerless, which exist although nobody has ever used them and nobody ever will. Dictionaries may seem to provide examples of such ownerless existence of expressions. Dictionary entries appear to be devoid of context; at the most, it seems that a context (sometimes a sentence context), in the form of phraseological collocations and examples, is occasionally added in order to elucidate the entry. When present in this role, however, they are meta-lingual expressions; even if they have the shape of sentences in terms of grammar, i.e. syntax, they are names of sentences, not sentences themselves, i.e. names formed identically as their denotations. But there are no dictionaries of sentences — sentences that would be isolated from senders, recipients and other elements of context. Besides, the nouns, adjectives, adverbs and verbs in a dictionary are not entirely context-less either, they do have their sender: the lexicographer who included them in this dictionary in order to himself become the first of their recipients/interpreters.

So does any sentence entirely devoid of all context exist at all? Is there any name that is entirely context-less? Of course, we are entitled to create such abstractions in our heads and then to constructing their theoretical analyses. But on the grounds of empiricism, we must assume that every language expression is to a greater or lesser extent embedded in its context. In view of this, I propose that we review the issue of the degree to which the meaning of sentences is dependent on their context.

9. THE MEANING OF A SENTENCE VS. THE CONTEXT

Such sentences as "$2 \times 2 = 4$" evince a minimal dependence of their meaning on the issue of who addressed the given specimen of this statement, where he/she does it, when, to whom and so on, especially if "=," i.e. "equals," is treated as an abstract tense-less verb form and if we overlook the fact that this formula is elliptical, because it ignores the relativisation "in the decimal system" which, after all, was somewhere and at some point invented by someone and endorsed by someone. To compare, let us analyse a sentence whose meaning very much depends on the context of its occurrence:

On 12^{th} August 2007 at 6 p.m. at Bracka Street 6 flat l4 in Warsaw, John gave Eva an Omega watch no. *N*, model *M*, so that on 13^{th} August of the same year Eva would not be late for the train no. *T* departing from station *S* on the hour *H* and *X* minutes for the destination of *Y* Spa.

The letter symbols in the above sentence should be treated as abbreviations for concrete data and not as variables; in addition, it must be noted that person *A* is the sender of this utterance, person *B* is its recipient, and the sentence was uttered in circumstances *C*.

If we uphold the condition that particular specimens of a given sentence as type must each have the same meaning as this sentence, what are the

candidates for sentence as type whose one specimen has been used here as the above example?

One of the possibilities would be to ignore those details which are unimportant in the given case, e.g. names of the giver and recipient of the present, the place and time when it was given, the type of the watch, the number of the train, its destination and so on. Yet if these details are unimportant, then why are they unimportant? Are they unimportant with regard to the meaning of this sentence specimen, too, and thus also with regard to the meaning of the corresponding sentence as type (let us recall the condition: the meaning of the sentence specimen must be identical to the meaning of the type of this sentence)? If the meaning of none of the disregarded names of these ignored details influenced the meaning of the entire sentence in question, and thus also the meaning of its sentence-type, then it would be possible to substitute proper names and other words which unequivocally determine their designates with other words, e.g. "Anna" and "Peter" instead of "John" and "Eva," "alarm clock" instead of "watch," "coach" instead of "train" etc. Then however, we would obtain a different sentence specimen, what is more — a specimen of a different sentence, neither identical to, nor meaning the same as, the given one.

Let us, then review the other possibility. In order to obtain a sentence type of which the above sentence specimen is a particular case, let us put variables in the place of personal names, details of address and other data found in this specimen, at the same time retaining the given structure of our sentence specimen. The result is a sentence schema. Is it endowed with meaning or only with a meaning schema (whatever this might be)? In addition, at which point should we stop putting variables in the place of details: do we retain (some) watch, if a mobile phone can just as well prevent the recipient from being late? And is the fact that the donor gave the watch, not sold or lent it, to the recipient important in this case, or not? If not, then "gave" may be substituted with "handed" or "conveyed," growing more and more distant from what is (in our opinion) unimportant in this case — now because of the intention and aim of the doer of the action, not because of the meaning of the sentence specimen he used. A hierarchy of increasingly abstract sentence schemata would emerge as a result, starting from the most universal and at the same time the most general one, e.g. "X performed action A to achieve result R." On which level should we place the sentence schema which is the sentence-type in relation to the sentence specimen in question?

I cannot resolve this. Also, I would like to point out that while accepting some sentence schema — a sentence function which is a model realisable in particular specimens of this sentence — in the role sentence as type, it

is necessary to deny it a meaning, at least a meaning understood in the same way as the meaning ascribed to sign specimens. It is also necessary to resign form the identicalness of shape and meaning between the given sentence specimen and the sentence-type of this specimen — and let me recall that identicalness of their meaning was supposed to be the basis for linking particular sentence specimens with their sentences-types. Finally, it is necessary to abandon the view that the contextual meaning of a sentence specimen is a modification of the lexical meaning of the respective sentence as type.

10. THE MEANING OF A SENTENCE SPECIMEN VS. THE SENDER AND RECIPIENT

Since we communicate by exchanging specimens of sentences, and not specimens of names or other expressions; since we express the results of our investigation of the world by means of specimens of sentences and we reason using sentence specimens as premises and conclusions, it is, above all, necessary to ask how is it that a specimen of a sentence, and not a specimen of a name or other expression, "has meaning, or sense." Perhaps this abbreviatory quasi-personification can be reduced to a formulation that would be free from the words "meaning" and "sense." So, I send a sentence specimen. In this specimen, I attempt to convey to its recipients a part of the topic of my thoughts and of what and how I am thinking of this topic — or what and how I am feeling or experiencing. The part I attempt to convey is, to be precise, the part whose formulation is this sentence specimen. Often this "verbal package" contains an extra — something I did not mean to convey; "words lie to thoughts," after all. In many cases, this extra — which is added contrary to my will or even knowledge — includes some contents which I did not wish to reveal or even contents which I wished to conceal, for instance some semantic, i.e. logical, presuppositions or (more often) some pragmatic presuppositions and the so-called implicatures. Often I am not successful in conveying all that I wished to convey in the sentence specimen which I have sent, because I overlooked some logical understatements and, in the given situational context, some enthymemes and elliptical communications did not have a chance of being correctly deciphered or completed.

In relation to this, some scholars speak of the schematic character of text and the information gaps. So the sentence specimen which is sent does not carry everything that the sender intended and not only what he intended; some of what he intended to communicate can be warped.

Then the sentence specimen gets to the recipient, who begins to unpack the package he received. He is armed with knowledge from encyclopaedias and dictionaries; he carries the burden of his experiences and habits; he is

influenced by his environment and his past. Hence he does not assimilate and internalise the entire contents of the information package he received. This is because the tools he possesses do not allow him to open some of the vessels filled with information which are contained in that package. He overlooks some data, while others from his point of view appear otherwise than they are: different in colour, shape or size. In brief, he does not receive all that sentence specimen contains, he receives more than it contains, and a part of what he has received, he transforms in his own way.

Are we, then, dealing with two kinds of meaning: the meaning as perceived by the sender of the sentence specimen on the one hand, and the meaning as perceived by the recipient of the same sentence specimen on the other, the latter being different from the former, i.e. constituted as a result of the so-called concretisation (a term introduced by Roman Ingarden)? If so, which part of these two meanings can be assumed to constitute the third meaning, i.e. the meaning of the sentence specimen itself? If, of course, it is worthwhile to construct such a concept, i.e. if it has a goal, for example because such meaning, supposedly being an objective one, is occasionally subject to the process of reworking known as "sentence decoding" or "sentence processing."

It is generally known that there are many theories of the meaning of language expressions:

– of the meaning of sentences as opposed to the meaning of names and other words or phrases;

– of the concept of meaning in the broad sense, encompassing the totality of semiotic features of an expressions;

– of meaning as a semantic function or relation in the narrow sense;

– of the dictionary meaning as opposed to the contextual meaning;

– of the prepositional, i.e. cognitive meaning as different from the expressive meaning and the emotive meaning, the latter associated with the so-called perlocutionary power of expressions.

The names of these variations of meaning and the theories which pertain to them are often misleading. For instance, the expressive meaning and the emotive meaning are just as "cognitive" as the so-called referential meaning, and they are referential, too — only the referential meaning points to the entities denoted by a given expression, thus helping to cognise them, and so it is "cognitive," whereas the expressive meaning (from *exprimere*, "to express") expresses the experiences of the sender and hence provides knowledge about them; hence it is also cognitive, only it provides information about a different issue. Finally, the emotive meaning (from *emovere*, "to move," "to stir," cf. the phrase "to feel moved," i.e. emotionally stimulated): this term, unless used as a synonym to "expressive," points to the results of using an expression, so it also enables cognition, only in this case, it is the cognition of the reaction of

the listeners or readers caused by receiving the expression. Incidentally, such phrases as "the meaning points to/expresses/indicates" can be substituted with sentences telling us of what the sender does by means of the specimen of the expression he used, or, in other cases, of what the recipient of the specimen of the expression discovers or guesses.

11. THE SENDER'S INTENTIONS VS. THE MEANING OF HIS STATEMENT

The connection between communication and the psychological experiences of the parties involved in communication is obvious. Thus, semiotics cannot be separated from psychology, because every conception of sign and meaning (especially the linguistic sign and linguistic meaning) contains, albeit sometimes implicitly, psychological concepts. One of these is the concept of intention.

Intentional theories of the meaning of expressions emphasise the role of the speaker's intentions in the process of communication, including the influence of the intention on the meaning of the statement being sent, i.e. (to avoid the metaphor and personification) how the topic of which I speak, what I say about it and how I do it depends on what I wish to say.

Generally speaking, the word "intention" is often colloquially used instead of "goal" (especially an undisclosed goal) or "objective," in the latter case to speak about a thought focused on a goal accompanied by a desire to achieve it or to refer to a not-yet-achieved object of desire. Also, "intention" has an objective aspect (cf. "goal") and an active aspect ("to drive towards something," "to tend to something"). The Latin word *intentio* means "tension," "intensity;" hence the reference to "attention" and "goal." These language intuitions pervade the word "intention" in its philosophical role, which nevertheless differs in many respects from some of its colloquial uses.

In the medieval scholastics, the reasoning behind some action, i.e. the realisation that one wishes to undertake this action, and the act of the will enabling one to undertake it were both called "intention." Thus, intention was the act of turning one's mind towards something that is not the mind itself, as well as the goal of that turning, i.e. some object or contents. Subtle and detailed conceptual differentiations were made and particular kinds of intention were provided with their proper terms. Two of the medieval concepts, i.e. *intentio prima* and *intentio secunda*, particularly strongly influenced the later analyses of semantic functions of expressions. First intentions referred to the things towards which our thoughts are turning; second intentions referred to other intentions. This reverberated in semantics, namely in the distinction between signifying and meaning. The fact that the conception of intention encompassed the aspect of the motive for action, the

will to act and the turning towards something that exceeded the mind may have contributed to noticing the dynamic, pragmatic aspects of language and the combination of the aspect of act and the aspect of possibility in it. The act of speech and the parallel act of thinking have this in common that it is impossible to think of nothing, speak of nothing, ask nothing, command nothing, justify nothing etc. Secondly, in speech, and perhaps in thinking too, there is an addressee, a recipient. The addressee of the process of thinking is the thinker himself, just as the addressee of a monologue is the speaker himself.

The participation of the addressee/recipient in the act of speech requires the sender to have a twofold intention: a semantic one — to tell about something which does or does not exist empirically, and a pragmatic one — to successfully and effectively tell, inform, ask, convince, etc., someone of something. This is precisely why intentional conceptions focus on the influence of the statement's sender on the semiotic functions of the expression specimens he sends; this is accentuated by the theories of speech acts, perlocutionary power and implicatures. But the intentional conceptions also imply that the recipient of a statement influences its meaning. This is because he attempts to understand properly (a pragmatic relation) what has been said about what topic, i.e. to grasp semantic information contained in the statement addressed to him. Thus, the intentions of both speakers meet in the domain of the statement specimen which one sends and the other receives. At times they meet amicably, to create its meaning together, but at times they clash, and then this meaning is altered.

It would be hard to deny that there exists a connection between the meaning of an expression which states its author's intention and the contents of that intention; on the other hand, there is also a connection between this meaning and the way it is understood by the recipient of the text. It is clear, however, that the sender's intentional contents, which depends on, among others, his knowledge, differs from the recipient's intentional contents, which, in turn, depends on *his* knowledge and other elements. The contents of convictions is one of the very many signals of these differences between the communicating parties' intentional contents. According to some scholars, in turn, the meanings of sentences which express this contents are derived from this contents.

Terms used in intentional theories, e.g. "intentional contents," "meaning intention," "the object of intention" are usually metaphorical and often imprecise. It is especially difficult to determine whether the words "contents" and "meaning" which form a part of those terms (the latter used as an adjective) are applied in the broadest, broad or narrow sense. In the broadest sense, "meaning" embraces all the semantic and all the pragmatic functions

of an expression, each of them separately and all of them in general. In the broad sense, in turn, the word "meaning" is usually appended to the totality of semantic functions or to each of them, i.e. designation, denotation and logical values of judgments in a logical sense. Finally, in the narrow sense, only the function of intension is considered to be a "meaning" one. The term "object of intention" can be variously interpreted as well. This "object" may be anything to which the intention pertains: a singular concrete thing or features of this thing, elsewhere called the "content of intention," and, besides, a state of affairs, an event, a phenomenon etc., each of them separately or in general. Hence, the occurrence of the phrase "object of intention" does not guarantee that it means precisely an object and not a feature, quality, contents etc. As a result of these faults, without settling on concrete terminology it is impossible to determine whether the convictions expressed in sentences that are equivalent but do not mean the same, e.g. "The grave of Boleslaw Prus is at Powązki Cemetery" and "The grave of Aleksander Glowacki is at Powązki Cemetery,"[1] have the same or different intentional content. Intentions and convictions are categorised as propositional stances and, in fact, the terms "intention," "intentional state" and "propositional stance" are sometimes used interchangeably; the case of the contents of propositional stances is therefore analogous. In the descriptions of those stances, a distinction between the object of the stance and its contents is usually not made; all that is done is to distinguish the state of the propositional stance from its contents. The contents is a logical judgment (however it is understood) with regard to which the stance is taken; this stance is called "propositional" precisely for this reason. It would seem, therefore, that it is the object rather than the contents of the given stance. Perhaps the scholars are reluctant to call this contents an "object" because it "does not exist," for instance in the cases when a person desires a nonexistent thing. Incidentally, this does not stop anyone from calling the thing to which an intention pertains its "object." And yet, even if the distinction between the concept of propositional stance and the concept of intention is made, some propositional stances are difficult to distinguish from intentions.

Since we assume a propositional stance towards a judgment in a logical sense, since a logical judgment is considered to be the meaning of an indicative sentence, and since at least some propositional stances are difficult to distinguish from intentions, we may assume that the connection between the speaker's intention and the meaning of his statement becomes evident. Hence, are intentional theories of the meaning of expressions convincing in explaining that the meaning of an expression is what I want to say while

[1]Bolesław Prus was the pen-name of Aleksander Głowacki, a 19^{th}-century writer and essayist (translator's note).

making use of this expression? I think they are only partially convincing. First, the speaker's intention extends above all to the sentences he utters, not to other kinds of expressions; for instance, the use of "as well" instead of "and" does not require me to change the contents of my intention. Second, the speaker's intention is realised in particular sentence specimens, not in sentences as types, so it does not explain whether the latter "mean" anything in the sense of the verbalisation of this intention and what exactly they "mean." Third, in some cases the intention is a "meaning" one in the narrow sense, in other cases in the broader sense, and in still other cases in the broadest sense and then it becomes a semantic/pragmatic intention. Fourth, for instance in metaphorical uses, the speaker wishes to convey a different thing than is conventionally conveyed by the given expression in the literal meaning. This happens also in non- metaphorical uses, e.g. "Can you turn down the radio?" (the intention is for the radio to be turned down, not to enquire whether the recipient is able to do it due to his talent, capability, conditions of the location etc.). Fifth, the speaker's intention is not always realised properly, of which the speaker may not be aware; it is not realised properly because, firstly, the speaker may not have found the correct formula to express his thoughts and emotions he wised to convey and secondly (for instance in a written text), because the context of the inscription modified whatever the sender had wished to convey. Moreover, no-one else is able to grasp this lack of appropriateness, because it is the text that is given, not the experiences of its author; a text is a window through which we look at them, not the other way around. This is additionally overlaid with the recipient's intention. Assuming his own propositional stance, the recipient will often "hear" something different than he is being told or will "write" his own individual intention into the text he is given. All in all, intentional theory of the meaning of expressions is not universal; it explains only some of the issues arising from its assertions, in particular from the assertion that the contents of the speaker's intention is the meaning of his utterance.

12. THE MEANING OF EXPRESSIONS VS. THEIR UNDERSTANDING

While intentional theories placed the sender of the expressions in the role of the constructor of their meaning, the opposite end of the spectrum is occupied by theories which propose that the issue of what the meaning of expression actually is, is essentially reducible to answering the question of how is it that these expressions are understood. Thus, the person of the recipient is placed in the foreground, even though, of course, we assume (sometimes too hastily) that also the sender understood the text he was sending. Whether a person understood what he had heard or read is indirectly indicated by various signs, e.g. his own feeling of understanding it (which,

however, is not directly available to anyone else), his assurances that he had understood the received text (which, however, needs to be checked), his ability to apply the expression in an appropriate verbal and situational context, to give correct examples (especially model ones), his ability to provide a faithful translation, to articulate some logical consequences of the received sentence, to explicate an imprecise formula and so on. The act of ostension, i.e. pointing a finger to the object whose name is found in the text or which is being spoken of in the given sentence, is related to the act of quoting an example in a sign form, e.g. a verbal formula or a drawing. Here, we enter the domain of a different theory of meaning, according to which the knowledge of meaning relies on our knowing the sentence's veracity conditions. This is because these conditions include states of affairs or events, i.e. changes in states of affairs, which fulfil this sentence. This will be further examined in the next chapter.

One of the conceptions of understanding expressions is proposed by the associationist theory of it, which is an element of a more general theory embracing all conscious processes. The latter had many distinguished adherents among psychologists. Its linguistic part was popular among linguists in the first half of the 20^{th} century. This theory of language, or rather of speech, describes the meaning of expressions mainly from the position of the sign's recipient. It proposes that an association between a representation of an expression or a thought about this expression and a representation of an object or the thought about this object (in the broad sense of the word "object") emerges in the mind of this participant of the semiotic process if this person previously encountered both of these elements, i.e. the expression and the object, as adjacent in time or space, as contrasting with each other, as very similar to each other (Aristotle) or in some other way connected, at least in the perception of this person, especially in a way which is for some reason important to him/her. For this person, the meaning of a given expression is this representation of the object or the thought about it, associated in his/her mind with the representation of this expression or a thought about it. This theory has been recurring since Antiquity until the present day; it must be said that it contains apt intuitions as well as assumptions for which it was rightly criticised, for instance, very perceptively, by Kazimierz Ajdukiewicz. In the context of the current considerations, the main difficulty with accepting the associationist theory of the meaning of expressions is the fact that it does not explain how I understand a sentence which I have never encountered before, considering that I cannot associate such a sentence with what it refers to on the basis of my earlier experience, because I have no such experience. Another difficulty pertains not only to sentences, but to all expressions. If each of two persons associates, respectively, his/her own

representation of a given expression with their own representations of an object (perhaps even the same one) — and these representations, naturally, differ — then the meanings of this expression will also be different for each of these persons. How, then, can people who use this expression understand one another? In addition, it may happen that John and Peter associate their representations of the same expression E with representations of different objects, O_1 and O_2. Thus, the meaning of expression E is different to John and to Peter not only because their representations, being individual and subjective, differ, but also because they are representations of different things, so they cannot be identical in important respects. Finally, this theory does not resolve whether the associated elements are a specimen of an expression and a specimen of some extra-lingual thing, or an expression as a type and a thing as a type, or some other combination in the scope of this pair. If the associationist theory of the meaning of expressions was to pertain to types of expressions, and not to specimens of expressions, it would be useless with respect to explaining the mechanism due to which, in particular conditions, by means of sentence specimens we convey to recipients information about ourselves and about the world. The faults of associationism in linguistic theory which have been enumerated above suggest that it requires more effort; its adherents should, for instance, specify what they mean by saying that the meaning of a given expression is a representation of the object or the thought about it, which is associated with this expression. Is this supposed to be the contents of the representation or the object of representation (because, I assume, not the act of representing)? And if, in the case of a sentence, its meaning is the judgement associated with this sentence, is this a logical judgement or a psychological judgement? The fact that this theory sometimes refers to experiences that are very familiar to speakers — for instance when hearing a name of some person being mentioned brings to mind this person's appearance or deeds — is an asset of its psychological part. Another asset is that this theory is applied in the Berlitz method of teaching a foreign language. And the greatest asset is that this theory bridges the gap between the psychology of language and neurophysiology, as it formulates hypotheses concerning a parallelism between associations in a person's consciousness and connections in his/her cerebral cortex. As a theory in linguistics, associationism is partially successful, for instance when it explains how, on the basis of his/her earlier experiences in the practice of a given language, the user passes from reading or hearing a name (especially a name of an object open to sensual cognition) on to imagining its designate and then to imagining those of its features which may constitute the meaning of this name. This theory also successfully explains how the user extracts from his/her memory a name upon seeing one of its designates or a correct

word upon encountering its typical verbal context. These hypotheses constitute the input of associationism into explaining the process of understanding expressions.

In one of its senses, the phrase "I understand you" conveys the information: "I understand what you mean by saying this." So, if I understand some expression, I know what it means. Does this also work the other way around, i.e. if I know what expression E means, then I understand it? If this implication were valid in both directions, we might assume that understanding an expression is tantamount to knowing this expression. This assumption has some consequences. The subject of understanding is an individual person, and its object is a concrete specimen of an expression; a specimen, not a type. This is because both sides of the mutually symmetrical relation "to understand" appear in a specific context which influences both of them. A change in the reception circumstances may result in an expression specimen E_1 of the type Pt_1, sent at time T_1 and in location L_1 with intention I, being understood differently than "the same," or, more precisely, identically shaped specimen E_2 of the same type Pt_1, received at time T_2 and in location L_2, even though the sending intention I has remained unchanged, and even though occasionally the recipient is the same person as before. This pertains as much to separate words as to sentences. In addition, it happens that the recipient is unable to detect the sender's intention, because the expression is ambiguous and the context in which it is received does not determine which of the meanings should be selected. For instance, in the late 19^{th} century the Polish sentence "Straciłem kondycję" (literally: "I lost [my] condition") may have been understood, depending on circumstances, as "I lost my job as a private tutor" or "I lost my physical and psychological potency." The hesitation of a 19^{th}-century interpreter of the above sentence would probably be increased by the fact that the loss of a job usually influences a person's "condition" in the latter sense, and even in a third sense, i.e. as the material circumstances, the fortune. Another case is illustrated by the following situation of the same recipient: a five-year-old Johnny does not understand the world "quintessence," but, as he grows from Johnny into John, he begins to understand it better and better. The fact of understanding an expression is not static, it undergoes gradation — it is a typological concept. In addition, to understand something does not mean to pass from ignorance to full knowledge in one big step; it means a process of arriving at an increasingly complete knowledge, which unfolds within the framework of semiosis. This was underlined by, for instance, Peirce's pragmatism, in which semiosis was presented as an endless hierarchy of a sign's interpretants and as a sequence of still new logical consequences contributing to the emergence of a "habitus" in the person who draws the

conclusions.

Much supports the assumption that what we are trying to understand are specimens of expressions, not expressions as types. Hence, if the view that understanding an expression is tantamount to familiarity with the meaning of this expression is correct — and if correct is also the generally and imprecisely formulated view that the meaning of an expressions equals the understanding of this expression – many problems emerge. Some of them have already been indicated in the section referring to the associationist theory of meaning. The first of its faults is the subjectivisation of meaning, which results in the ambiguity of every expression. After all, an expression — especially one having many occasional components, e.g. pronouns, anaphors, various categories of adverbs, grammatical tense markers etc. — is understood in many different ways, both by the same recipient in varying circumstances and by different recipients, the latter even when the circumstances are similar. Since I am of the opinion that every specimen of an expression has the so-called situational context parameters referring to its particular occurrence, i.e. its time, place, users assuming specific propositional stances etc., and it also has the already mentioned marker elements, I consider occasionality to be a universal trait of all the elements of speech. I also consider independence from context to be a feature ascribed only to prepared samples, and not all of them at that. We have made these prepared samples ourselves, by applying abstractions and generalisations and by obtaining meanings of expressions as types — meanings created from the shared elements found in the most frequently encountered ways of understanding a large number of specimens of expressions of a given type. Subsequently, we have placed these prepared samples as elements in a language system, which is called "language" as opposed to speech. In these circumstances, it is worthwhile considering whether the concept of understanding, or the manner of understating, an expression should not be separated from the concept of the meaning of this expression, as Kazimierz Ajdukiewicz did when making a distinction between the meaning of a sentence and its connotation.

The opponents of the above solution are faced with the question whether we arrive at understanding a sentence as a result of understanding its components or the other way around: from understanding the sentence we arrive at understanding its components. To put the above succinctly and metaphorically: the question is whether the meaning of a sentence consists of the meanings of the components of this sentence (or even is entirely delineated by the meanings of these components and by their arrangement, i.e. syntax) or, conversely, the meaning of each of the sentence's components is a part of a legacy of the meaning of the entire sentence. I am unable to resolve this issue. Each of its solutions is supported by different arguments.

For example: the assumption that meaning is primarily ascribed to sentences and only indirectly to their components would be supported by the fact that we use sentences, and more precisely sentence specimens, as tools in linguistic communication and reasoning. We express our thoughts by means of sentences, not components of sentences. If a sentence expresses a logical judgement and this judgement, in turn, is considered to be a set of possible worlds in which this sentence is true, what we grasp is this judgement in its totality, not its components. Also, our pragmatic intentions seem to turn to sentence specimens, not to particular words; we assume propositional stances with respect to sentence specimens, not with respect to words. Whether semantic intentions are directed only or mostly at sentences is a debatable issue. The fact that, according to the referential theories of linguistic meaning, we grasp this meaning by arriving at an awareness of the veracity conditions of a sentence, not of a word, would also seem to support the assumption that meanings should be associated first with sentences, and only indirectly with components of sentences. Also, we specify the meaning of a word, occasionally in a context of a sentence, by means of a semantic definition. For example, the meaning of the noun "phtysiatrist" is explained with the semantic definition: "'John is a physiatrist' meaning that John is a medical doctor specialising in the prevention and therapy of tuberculosis." On the other hand, however, our experiences acquired while composing sentences (especially in a language with which we are not very familiar) would support the assumption that the meaning of a sentence arises from the previously discovered meanings of sentence components. These experiences bring to mind the image of assembling familiar words, or words found in a dictionary as equivalents of words we know, and laboriously putting them together into meaningful sentence units according to some rules of composition. But we reconstruct these rules on the basis of the syntactical features of an entire sentence as a meaningful unit; a vicious circle looms. Also reading and reaching the state of understanding which one is reading, especially when the text is difficult or the language foreign, relies on assembling words (in Latin, *lego* means "I gather," "I assemble" and only secondarily — "I read"), realising what each of them means and guessing the sense of the sentence composed of those words. However, to weaken this argument, we might recall that in order to realise the meaning of a sentence component, we often refer to the above-mentioned veracity conditions of this sentence, e.g. when the meaning of the conditional conjunction "if, then" is explained by means of an enumeration of the conditional's veracity conditions. We are back where we started then. A different difficulty arises in the case of amphibological statements, e.g. "Upadek rządu wywołał krach na giełdzie." Familiarity with the meaning of each of this sentence's components does not cause familiarity

with its meaning, because situational context entitles us to interpret it as "The fall of the government caused the crash on the exchange" or as "The crash on the exchange caused the fall of the government" — after all, either event is likely to occur in such circumstances — and, in addition, syntactic and stylistic rules of the Polish language do not determine unequivocally that the first noun, "upadek" (a fall), must be the grammatical subject of this sentence and the word "krach" (a crash) must be its grammatical object, i.e. the complement of the predicate "spowodował" (caused). Listening to radio and television speakers, one might actually imagine that the media people are specifically taught to place complements at the beginnings of sentences in order to turn the recipient's attention to those elements which are the most important from the sender's point of view.

The question of what comes first: the meaning of a sentence or the meaning of the sentence's components, remains unanswered. Answering it would require the cooperation of several disciplines: linguistics, semiotics, neurophysiology, psycholinguistics, cognitive psychology, logic, the philosophy of language, cognitive sciences and informatics. It would also require the inclusion of research on early language acquisition and adult language acquisition, research on the relations between thinking and speech, also in the cases of neural damage and among the deaf-mute, research on neural states and the type and intensity of reactions in the process of overcoming obstacles during reading and processing texts and constructing utterances, and many others. Contributions from a variety of scholars seem to indicate that — after an interval of several decades — the traditional view which ascribes primacy in the task of conveying semiotic, and especially semantic information to words, not to sentences, is back in favour. The issue of the connections of language with cognition, of speech with thinking, which has been found intriguing for centuries, is still far from being resolved. For a long time, it seemed that it is impossible to think without having the gift of language, if to the smallest degree. The hypothesis assuming a parallel existence of the language of thought and the verbal language and the hypothesis that the relations within one and the other are mutually corresponding and illustrate the structure of reality, are tempting indeed. Some studies, however, undermine the conception of the "mentalese" language and point to cases of thought occurring without using lingual prostheses (the opposite cases: of speaking without thought prostheses, we are very familiar with). In considering the thought — language — reality triad, it is necessary to decide whether it is the language that mediates between thinking and reality (because it forces thoughts into the confines of structure and thus formulates them) or, conversely, thought that mediates between language and reality (because it provides lingual forms with interpretations), or, finally, the two

elements, thinking and speaking, interact and thus both cases are true. Perhaps these issues will become easier to resolve when the deliberations are accompanied by the picture of a concrete situation in which concrete speakers are using concrete specimens of sentences.

13. MEANING AND SIGNIFICATION — MEANING AND TRUTH

Living in a lingual community, each of us comes across a thoroughly familiar communicative situation. People use expressions to speak about diverse elements of the world, including themselves — the elements towards which their thoughts, feelings, desires etc. are turning. In some cases, each of the two different specimens of an expression refers to a different thing, event or phenomenon; in other cases, they refer to the same one, but in a different way; they may also refer to the same thing in the same way. We perceive the world — or: all we can think of, or more generally: all we can experience — as composed of separate pieces. Some of these pieces, such as tress or animals, are separate by nature. Others, like books and houses, are separate as products of our actions, i.e. because we made them separate. Still others are discrete fragments of reality to us only because we brought them into being as a lingual product of hypostasis or because we fished them out of the world with linguistic tools, calling one portion of reality we have drawn by this name and another portion by another name. Speech is not only a mirror (sometimes a distorting one) which reflects a pre-existing world, but also a knife which cuts reality into pieces, segmenting it; it is also a distribution tool which subsequently puts those pieces in order, arranging them in accordance with the categories of language expressions. The so-called referential theories attempt to explain the connections between those expressions and segments of reality, i.e. the semantic relations.

Referential theories emphasise the concept of the meaning of sentences. The main principle is variously formulated, i.e. "the meaning of a sentence is given by means of this sentence's veracity conditions" or "the meaning of an indicative sentence can be given by enumerating some conditions under which this sentence is true," or even (less circumspectly in the first part of the formula and more cautiously in its latter part) "veracity conditions of a sentence may be identified with its meaning when this sentence's veracity conditions are not dependent on the context." The ambiguity of the word "condition" (in Polish: *warunek*) must be pointed out especially with regard to the last of the above formulas. In addition to the distinction: the "necessary/sufficient condition" and the "sufficient/favourable condition," the event on which depends the occurrence of the conditioned event, and the very statement that this-or-that is a condition for another thing, or, finally, the contents or meaning of this statement are also called "conditions." Of course, an event cannot be a meaning or a part of meaning of an expression.

The following reservation arises at the very outset: in order to be able to state the veracity conditions of a given sentence, I must known what it means – and yet I am to learn this only upon stating its veracity conditions. As a way out of this quandary, it is proposed that I compose the meaning of a sentence myself, deriving it from the meanings of its components according to the syntactic rules of this language in question. This proposal is based on the assumption that I am able to do it, as long as I know the structure of a composite expression or its logical form and I accept the principle of language composition. But is this always the case? After all, these rules were reconstructed on the basis of the analysis of, among others, the meaning of entire sentences. The meanings of particular components are to be determined by what each of them refers to, i.e. by means of the fulfilment conditions or the conditions of the correct use of a given expression. What is being meant here (and some theories expressly state this reservation) are exclusively expressions as types, because, according to this conception (which is controversial indeed), their meaning is entirely free from the influence of the context. Thus, it is said that by pointing to whom or to what some proper name refers, we state its meaning; by pointing out whom or about what some predicate can be correctly stated, we explicate its meaning. These assumptions ignore some important issues.

This is because, according to some views, expressions taken out of context do not refer to anything, and it is the meaning of each of them that decides to what they refer, not the other way around. As to proper names, some scholars, e.g. John Stuart Mill, deny them any connotative meaning, whereas others, e.g. Gottlob Frege, assume that the sense of a "truly" proper name is a description which permits us to identify the bearer of this name. Still others agree to a cluster of descriptions as a meaning of a proper name; according to one opinion, proper names are the so-called "rigid designators," according to another — their meaning is in each and every case reduced to the contents of the phrase "precisely thus called." Finally, it is sometimes assumed that the relation between a proper name and its bearer is rooted in an arbitrary act of conferring a name on someone or something and is subsequently cemented by the fact of successive generations of speakers making use of this name; the concept of the meaning of proper names is therefore redundant. Is this supposed to mean that there exist some components of language, namely proper names, which do not mean anything and yet are expressions of that language?

Other obstacles, too, threaten the application of the referential theory of meaning. The meanings of some categories of expressions cannot be defined in any other way than in the context of sentences; this is, for instance, the way to define conjunctions, i.e. sentence- generating functors

of sentence arguments. The resultant definitional sentence formulas, which develop the meanings of these conjunctions, would themselves require the application of the same referential theory to their meaning. The case of sentence components themselves being sentences, which occurs in compound sentences, is analogous. Thus, in order to determine the meaning of each of them, it would be necessary to enumerate its veracity conditions and to apply the composition rule. This rule would have to consider the differences in the meaning/signification relation depending on its occurrence within intensional structures or extensional structures.

To put it briefly and imprecisely: if, according to referential theories, the meaning of an expression is to lie in the veracity conditions of a sentence or the correct use of nominal expressions, then — in order to state the meaning of a given expression — I should state (making use of a sentence formula) that, in the given case, conditions of the veracity or proper usage of this expression are such-and-such. This sentence formula also has its own meaning. What it might be, I shall determine by enumerating its veracity conditions, and so on.

The next difficulty is as follows. I am not able to state veracity conditions of every single sentence, not even every indicative sentence. For instance, what are these conditions in relation to the amphibological sentence "Upadek rządu wywołał krach na giełdzie?" What are the conditions of the correct use of the well-known phrase "the love of three colonels?" There is more: are veracity conditions the same in the case of a sentence in the active voice and its transformation into the passive voice? After all, some scholars declare that their meanings differ with regard to some pragmatic aspects. What veracity conditions should be associated with mythological sentences and sentences found in literary fiction? To deny them meaning would be a misunderstanding, to state that they are false would be an unproductive declaration and to ascribe veracity conditions to them might require us to break with the classical conception of sentence veracity and to agree to use a different concept of truth, e.g. as compatibility with sentences contained in the text of the myth or the literary text. Then, however, the so-called "veracity gaps" would emerge, for example when I would say "Othello was left-handed" while the text does not state what the case was, i.e. whether he was left- or right-handed. Also, in some cases it is impossible to determine whether a sentence referring to a future event or situation is true or false. This makes some scholars lean towards resigning, in some cases, from the two-value logical approach and to accepting the anti-realist views; with regard to the theory of meaning, this means replacing the concept of the sentence's veracity conditions with the concept of the conditions of its warranted assertion or assertibility. But when is the assertion of a sentence

warranted? Is it not when this sentence is true? A related idea can be found in Kazimierz Ajdukiewicz's views: in the 1930s he introduced in concept of sentence acknowledgement, but, correctly, he linked the acknowledgement of a sentence not with the meaning of this sentence, but with the conviction expressed by means of this sentence. In this way, Ajdukiewicz avoided the dangers which may have arisen from linking the stating of a sentence with this sentence's veracity conditions.

The applicability of referential theories of meaning is seriously hampered by the difficulties in formulating veracity conditions in relation to non-indicative sentences. I am not convinced by the attempts to reduce imperative or interrogative sentences to the allegedly synonymous indicative sentences in order to identify veracity conditions for the latter. For instance, when John says: "Speak more slowly, Peter," it does not mean "I, John, command you, Peter, to speak more slowly." The first sentence tells about the manner of speaking, the second about my action. Nor can this sentence be reduced to "Peter speaks more slowly," even though similar suggestions for allegedly synonymous substitutes have been made. In addition, it is impossible to free these paraphrases from the influence of context.

The next point: referential theories of meaning prove helpless when faced with the changeability of meaning depending on context and the general occasionality of language expressions; this is exactly why they stop at considering the issue of expressions-types and they neglect to consider differences in the meanings of specimens of the same expression-type. They are also unable to grasp the difference between expressions which are equivalent but have different meanings, since both have the same veracity conditions or application conditions. The sense of the last two concepts would have to be modified in order for referential theories to be able to make this differentiation; only then would they be able to ascribe different conditions to the sentence "John is certain the Descartes lived in the 17^{th} century" and the sentence "John is certain the author of *Discourse on the Method* lived in the 17^{th} century."

Finally, referential theories renounce meaning in the narrow sense, attempting to replace it with the quality of the potential fulfilment of the conditions of veracity or signification, i.e. designation or denotation. In my opinion, this approach impoverishes semantics, whose tradition — the tradition of Mill and Frege and their earlier and very early predecessors — offers a fruitful distinction between connotation and denotation, *Sinn* and *Bedeutung*, as a legacy inherited from their classical ancestors, intension and extension.

Referential theories of the meaning of expressions still have their adherents among the leading logicians and philosophers. Weighty arguments

in support of this position are also well known. For this reason, I limited myself to a brief presentation of only the doubts caused by the fact that those theories do not explain some issues which arise from the conception that meaning can be reduced to veracity or fulfilment conditions. This conception requires us to assume that these conditions are familiar to us from elsewhere. From where, then? From our participation in the acts of language communication, i.e. thanks to our use of expressions. I like this view.

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