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A TENTATIVE EXTRAPOLATION OF A CERTAIN LINGUISTIC RULE

Originally published as "Próba ekstrapolacji pewnego prawa językowego," Studia Semiotyczne 1 (1970), 23–29. Translated by Klaudyna Michałowicz.

The current article presents a proposal for extending certain regularities observed in the history of language to cover other areas of semiotics as well. Most importantly, the formula in question is crucial to psychological associations in general, and very significant in the cases when signs are influenced by material and functional context. The qualities characteristic of language, i.e. articulation and communicative function, as well as its conventional character create favorable starting-point conditions for this investigation, but, on the other hand, they are obscured in the general rule, which disregards both the material side of the sign and its special function.

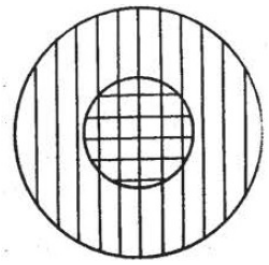
Let us therefore begin with some examples from the history of language; they will help us to isolate general concepts which we shall require.

1. In Semitic languages, similarly to Indo-European ones, the adjective, which primarily serves as an attribute, could also serve independently as an *abstractum*; cf. the Greek *αγαόν*, *κακόν*; the Latin *bonum*, *malum*; the Polish and Russian *dobro* (the old form of neuter adjective); the Spanish *lo rojo* — redness, *rojo* — red, etc. It can thus be said that the form of the Semitic adjective , in some cases the feminine and in others the masculine one, was ambivalent, e.g. *ar ḥasanatun*, i.e. fem. adj. "beautiful" and "beauty" (as an abstract). Such a form had the primary (basic) meaning of the adjective and the secondary (conditioned by context) meaning of the *abstractum*. The meaningful function of the adjective was the basic one because the *abstractum* represented a reduced, one-gender paradigm of an adjective whose inflection encompassed both the feminine and masculine

genders. What occurred here was a hierarchical relation relying on inclusion: the range of applications of the *abstractum* (= only a part of the adjective's inflection) was included in the adjectival range of application.

Let us identify the de-verbal adjective from *qatala* (verbum) with the symbol *qatal*. In (classical) Arabic, the paradigm of the verb *qatala* (3^{rd} person sing.) has either vowel endings (*-a*, *-at*, *-ā*, *-atā*, *-ū*) or consonant endings (*-nă*, *-nā*, *-ta*, *-ti*, *-tu*, *-tum*, *-tunna*). This inflection is generally parallel to proto-Semitic conditions.

At a certain point, a change in proto-Semitics caused a shortening of all the long vowels in closed syllables, e.g. *i͡aqūlu* "he is speaking", *taqūlūna* "you are speaking" (masc.), *taqŭlna* "you are speaking" (fem.), *qūlī* "speak!" (fem.), *qŭl* "speak!" (masc.) etc. In a closed syllable, a short vowel could thus be interpreted either as a short one or as a long shortened one. The hierarchy of those two forms depended on their range. In the above paradigm *qatala*, *qatalta* etc., the vowel of the second syllable was either short (*qatala*) or ambivalent (*qatalta*), i.e. the range (scope) of shortness was larger than the range of longness, with an inclusive relation occurring (see Fig.).



The inner circle corresponds to closed syllables with vowel length ambivalence in their vocalism. Vertical shading = the range of shortness; horizontal shading = the range of longness.

There exists an inclusive relation between *qatăl*, a de-verbal adjective with short vocalism, and *qatāl*, a different de-verbal derivate, which can be created owing to an ambivalence of vowel length in verb forms having a closed syllable (*qatalta*, *qataltum* etc.). In the face of the hierarchical relation existing between the short and long vocalism, *qatăl* (with the short one) represents the primary sound form, and *qatāl* (with the long one) represents the secondary one.

Thus, a hierarchy (based on an inclusive relation) evolves between the primary and the secondary function, and between the primary and the secondary sound form; it is therefore evident on the level of sounds as much as on the level of meanings:

The functional (semantic) ambivalence is here crossed with sound am-

	primary function	**secondary function**
primary sound form	adjective with a short vowel	abstractum with a short vowel
secondary sound form	adjective with a long vowel	abstractum with a long vowel

bivalence. At some point, neutralisation of vocalism was used in order to assign a separate sound form to each of the functions (diversification).

Thus, the primary (i.e. adjectival) function acquired the primary sound form, i.e. the form with short vocalism, *qatăl*. The secondary function (i.e. *abstractum*) was expressed through the secondary sound form, i.e. the form with long vocalism, *qatāl*. The secondary function, i.e. the *abstractum* meaning, which until then had been conditioned by context, from that point on was autonomous, as it acquired a separate grammatical exponent: the lengthening of vocalism of the second syllable.

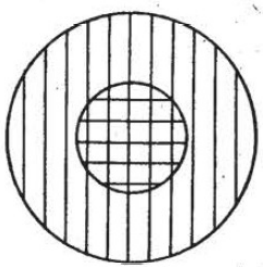
The resulting conclusion is as follows: there occurs an association of the primary function with the primary sound form, and of the secondary function with the secondary sound form.

2. In the Greek language, compound words whose second segment is a stem beginning with a *-r-* or *-n-* often replace the *e*-vocalism in the inflectional suffix with the *o*-vocalism, e.g. *πατήρ* : *όμο-π ́ατωρ* "having the same father;" *μήτηρ* : *alṕha-μήτωρ* "not having a mother = motherless;" *φρήν* "mind" : *όμό-φρων* "thinking the same way," *alṕha-φρων* "not having a mind = unthinking."

The semantic function of compounds with a nominal second segment was twofold. The fundamental (primary) meaning corresponded to the meaning of the second segment; hence **όμο-π ́ατηρ* would essentially mean "the same (= identical) father." However, such compounds could also be used as adjectives which "exocentrically" define some other noun. In a similar way, in Polish, *biało-głowa* "white-headed = grey-haired" can be used as an adjective to *kobieta*, *baba* ("woman") etc., but the compound *białogłowa* does not mean *głowa* "head," but "woman" (in contrast to the compound *żywopłot* "hedge," which does mean *płot* "fence"). Compounds with a nominal second segment were thus ambivalent; their primary (fundamental, main) function was "endocentric" (i.e. nominal, as resultant from the second segment in isolation), and their secondary (subsidiary) function was "exocentric" (adjectival). An inclusive relation existed between those two functions, because the meaning of the second segment in isolation was only nominal.

Some changes in the sound system which occurred in the prehistoric (Indo-European) era caused a sound ambivalence in some inflectional forms of nouns such as *πατήρ*. In *gen. sing. πατρός*, *dat. sing. πατρί*, the disappear-

ance of the vowel separating τ and ρ (the vowel which does occur in $\pi\alpha\tau\acute{\epsilon}\rho\alpha$, $\pi\alpha\tau\acute{\epsilon}\rho\epsilon\varsigma$ etc.) may have been interpreted as the disappearance of either *e* or *o*, because originally nouns ending with *-*$\tau\omega\rho$ (such as $\delta\acute{\omega}\tau\omega\rho$, $'E\kappa\tau\omega\rho$) also got rid of the vowel separating τ and ρ in *gen.* and *dat. sing.* Hence, in the face of $\pi\alpha\tau\acute{\epsilon}\rho\alpha$, $\pi\alpha\tau\acute{\epsilon}\rho\epsilon\varsigma$ etc., such forms as $\pi\alpha\tau\rho\acute{o}\varsigma$, $\pi\alpha\tau\rho\acute{\imath}$ were seen primarily as syncopated with $\pi\alpha\tau\epsilon\rho—'$, and secondarily as syncopated with $\pi\alpha\tau o\rho—'$ (inclusive relation) (cf. Fig).



The inner circle corresponds to *gen. dat. sing.* with an ambivalence of the syncopated vowel. Vertical shading = the range of *e*-vocalism.

Here, too, the secondary form is associated with the secondary function; hence from *$\acute{o}\mu o$-$\pi\,\acute{}\alpha\tau\eta\rho$ we get, in the exocentric function, $\acute{o}\mu o$-$\pi\,\acute{}\alpha\tau\omega\rho$ (with the meaning $\acute{o}\mu o$-$\pi\,\acute{}\alpha\tau\rho\iota o\varsigma$), "having the same father".

3. In the Lithuanian language, as in many others, some verbs demonstrate a grammatical ambivalence of the following kind. They may have both intransitive and causative meaning, similarly to the French *sortir* "go out" and "lead out", *descendre* "go down" and "carry down", or the English *to stop* (to stop moving oneself or to cause something to stop), *to shake* (oneself or someone/something) etc. Conversely, they may denote either an intransitive action or a state, similarly to the Latin *tacēre* "to fall silent" and "to be silent", Greek $\nu\iota\kappa\,\acute{}\alpha\nu$ "to win" and "to be the winner", $\varphi\epsilon\acute{\upsilon}\gamma\epsilon\iota\nu$ "to run away" and "to live in exile". In many similar cases differences in meaning are expressed in literature by means of an inherited nasal infix, e.g.

skriedžiú, *skriẽstí* "to turn something round" : *skrindú*, *skrísti* "to turn round"

splečiú, *splẽsti* "to decompose something" : *splintú*, *splísti* "to decompose"

And on the other hand

miegú, *miegóti* "to sleep" : *inchoativum -mingú*, *-mígti* "to fall asleep"

siaučiú, *siaũsti* "to be furious" : *inchoativum siuntú*, *siustí* "to get furious".

Yet there existed some verbs to which the nasal infix could not be applied: the ones whose stem ended with *r*, *l n*, *m* + a consonant, e.g. *vert*, *tvenk*,

temp etc. When verbs with this kind of stem were ambivalent, the hierarchy of the causative and intransitive function (according to the function of the state and action) was set in accordance with the pattern of those verbs in which both these functions had different exponents. As indicated by the direction of the derivation of verbs with a nasal infix, an intransitive verb with a nasal infix was based on either a causative-transitive verb, e.g. *skrindú* "I am turning round" from *skriedžiú* "I am turning something round", or a (intransitive) stative verb, e.g. *siuntú* "I am getting furious" from *siaučiú* "I am furious".

Thus:

φ_1 (primary function) causative-transitive : φ_2 (secondary function) intransitive

φ_1 (primary function) stative : φ_2 (secondary function) action

This hierarchy of functions was a necessary, although not sufficient condition of differentiation in those verbs which, owing to the structure of their stems, could not have derivative forms with a nasal infix. Differentiation was made possible only by the fact that certain consonant groups became ambivalent.

From a certain moment in prehistory, the consonant group *st* could result from a connection of a stem beginning with *t(d)* with a suffix or ending beginning with *t* or *st*.[1] Thus, such forms as *viršstas* (*part. praet. pass.* of *verčiú* "I overturn"), in contrast to such forms as *líktas*, *gírtas* (part. praet. pass. of *liekú* "I leave", *giriú* "I worship"), was ambivalent with regard to the sound form' concurrently the interpretation *virt-tas* was primary owing to *líktas*, *gírtas*, and the interpretation *virt-stas* was secondary. Similarly, in the infinitive, *líkti*, *gírti* in addition to *viršti* which suggests a possible ambivalence of the latter form (*virt-ti* or *virst-sti*).

The relation: *virt-t-as* : **virt-st-as*[2] resulted, in the *praesens*, in *virstú* in addition to the old form *verčiú*, while the secondary (intransitive) function was associated with the secondary form *-st-*. Similarly, *verkiú* "I am crying" (a state) : *virkstú* "to start crying" (*inchoativum*). This is the origin of present-tense formations with the *-st-* suffix which mean an intransitive action, in contrast to either the *causativum* or stative verbs.

[1] And, respectively, the identification of (*s*, *š*, *ž*, *sk*, *zg*, *šk*) + *i* with (*s*, *š*, *ž*, *sk*, *zg*, *šk*) + *st*, which merged to produce *st*, *št*, *žt*, *kst*, *gzt*, *kšt*.

[2] We shall not enter into the details of morphology here, as they have already been discussed in *Inflectional Categories of I. E.*, 1964, p. 51. The *praesens* derivation *virstú* results from the proportion *virt-t-as* : *virt-st-as* = *virt-t* : *virt-st*. But *virt-t* : *virt-st* equals *vert'- : virt-st* (hence *verčiú* : *virstú*), since the subtraction of the suffix *and* participle restitutes the verbal stem in its basic form (the one evident in the praesens).

4. In the Polish language, such a difference exists as in Russian, e.g. *uznajú* "I am recognising" and *uznáju* "I will recognise" (*praesens* : *futurum*), had to disappear because, among others, the word stress in Polish came to be fixed. In addition, contractions occurred: the sound group *-aje-* was reduced to *a* (originally a long one). Hence e.g. *poznasz*, *pozna*, *poznamy*, *poznacie*. In the 3^{rd} person pl. the contraction did not occur and hence it was, and still is, *poznają*.

In such forms as *poznasz*, *pozna* etc., the vowel *a* was ambivalent; it could represent either, simply, the vowel *a*, or a contraction of the sound group *aje*. A functional ambivalence was in evidence as well. After the blurring of differences caused by stress (and after the contraction) forms *poznasz*, *pozna*, *poznamy*, *poznacie* had the meaning of both the *praesens* and the *futurum*. In this case, the inclusion consisted in the fact that the *praesens* is essentially timeless, whereas the *futurum* denotes a future action. Hence, the *praesens* was the primary function, and the *futurum* was the secondary function of our paradigm.

Thus, at a certain point, there evolved a hierarchical relation, the hierarchy being based on inclusion with regard to both the sound form and the semantic function. Owing to the 3^{rd} person pl. *-ają*, the ambivalence of *a* in *poznasz*, *pozna* etc. was interpreted in the following way: the primary sound form was *aje*, the secondary was *a*. When it comes to the semantic function, the hierarchy resulted from the relation *praesens* (neutral, non-marked) : *futurum* (marked). In effect, *aje* got associated with the present tense, and *a* with the future tense. Hence:

	praesens	*futurum*
3^{rd} person sing.	poznaje	pozna
1^{st} person pl.	poznajemy	poznamy
3^{rd} person pl.	poznają (ambivalent)[3]	

Examples similar to the above are very many, and it is easily noticeable that traditional explanations found in historical grammars are often faulty from the methodological point of view. On the basis of the above examples let us attempt to reach a formalization, and then a generalization.

Let f denote a sound form (which may be a single phoneme, a group of phonemes, a phonological feature or a prosedeme), and φ denote a semantic function. Both f and φ are subject to influence of the textural environment, i.e. the context. For f, the context relates to sounds; for φ it is functional (semantic). Functional context includes contextual situation as well, which normally does not happen in the case of the sound context.

Neutralization, from which arises the relations of inclusion and hierarchy

of the segments of a language system, is a very pertinent concept here. In special conditions of the sound context, two elements f_1 and f_2 may undergo neutralization, which means that in those conditions the opposition $f_1 : f_2$ is cancelled in favour of f_1 (i.e. f_1 occurs instead of f_2); cf. e.g. the appearance of a voiceless consonant instead of a voiced one in the Polish coda *mag* (*mak*), *Bug* (*buk*) etc. Similar functional elements may be neutralized in special conditions of a functional (semantic) context, cf. the neutralization of the difference between the perfective (φ_1) and imperfective (φ_2) aspect in the present tense. The difference between *wybierał* 'he was choosing" (φ_1) and *wybrał* "he chose" (φ_2), between *będzie wybierał* 'he will be choosing" (φ_1) and *wybierze* "he will choose" (φ_2) is cancelled in the context of the present tense in favour of φ_1 (*wybiera*).

Conditions for the neutralization of sound forms and conditions for the neutralization of semantic functions are, of course, mutually independent.

Neutralization provides the foundation for the relation of inclusion: f_1 andφ_1 appear outside the range in which they differ from, respectively, f_2 andφ_2 (= the range in which f_2 andφ_2 are opposed to them). Inclusion causes the emergence of the hierarchy: the f_1 andφ_1 segments are neutral, i.e. non-marked, whereas f_2 andφ_2 are the marked segments of the respective oppositions $f_1 : f_2$ and $\varphi_1 : \varphi_2$.

Let the functions φ_1 and φ_2 correspond to the form f_1, i.e. in special contexts let the form f_1 have the secondary function φ_2 instead of the primary function φ_1. If at that point, in a definite sound context, neutralization of f_1 with some other sound element f_2 occurs (in favour of f_1), the result shall be the differentiation of $f_1\varphi_1 : f_2\varphi_2$, i.e. the emancipation of the function φ_2, which shall receive a separate formal (sound) exponent f_2, while until that point it was the contextually conditioned secondary function of the f_1 form.

Combinations $f_1\varphi_2$ and $f_2\varphi_1$ may be considered combinatory variants (functional or sound ones) with respect to $f_1\varphi_1$, but a meeting of f_2 with φ_2 produces a new sign. The occurrence of both conditioning contexts, the functional and the sound one, excludes the possibility of $f_2\varphi_2$ being identified with $f_1\varphi_1$.

Validity of the above formula is not limited to language signs. It retains its worth with respect to (relatively) constant associations and hence with respect to signs in general (which suppose constant associations).[4] To demonstrate the general character of the formula, some elementary experiments were proposed, which are currently being conducted by Professor W.

[4]The only restriction is the postulate that a material sign and its function are exposed to contexts, the material and the functional one, which result in neutralizations.

Szewczuk as the Chair of Psychology at the Jagiellonian University.

A viewer is shown a number of colourful geometrical figures (e.g. a yellow square, a white ellipse, a pink triangle, a grey circle etc.), repeated for as long as a relatively constant association of a given geometrical figure with a given colour is achieved. Differences between the figures may in some cases be neutralized, e.g. a circle seen at an angle may be perceived as an ellipse ("the angle context"). Also, the differences between colours may be neutralized, e.g. grey seen against a black background can be perceived as white ("the background context").

Let us therefore mark as f_1f_2 those geometrical figures, which in a certain context are neutralized in favour of f_1. Let us mark as $\varphi_1\varphi_2$ those colours, which in a certain context are neutralized in favour of φ_1. The aim of these experiments is to demonstrate that $f_1\varphi_2$ (in the context of a background that neutralizes the $\varphi_1 : \varphi_2$difference) and $f_2\varphi_1$ (in the context of an angle that neutralizes the $f_1 : f_2$ difference) are identified by the viewer as $f_1\varphi_1$, while $f_2\varphi_2$ (in a double neutralizing context) are perceived as distinct from $f_1\varphi_1$. In the first two cases ($f_1\varphi_2$ and $f_2\varphi_1$), neutralization is interpreted by the viewer, who decides (on the basis of f_1 orφ_1) in favour of the non-marked segment, i.e. in favour of the primary function or the primary "form" (φ_1 or f_1). In the last case ($f_2\varphi_2$), the accumulation of both contexts excludes the possibility of the $f_2\varphi_2$ combination being identified with $f_1\varphi_1$.

Irmina Judycka

RELATIONSHIPS OF WORD-FORMATION AND LOGICAL SEMIOTICS

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Object of word-formation research

Logic developed a theory of names to which Polish logicians of the Lvov-Warsaw School eminently contributed. However, logicians do not delve into the structure of names of certain type, and treat them as inseparable lexical units. Yet in natural (e.g. Indo-European) languages there are words whose structure is decomposable into at least two elements. Such names are, among others, the subject of research of the linguistic area called word-formation.

Polish linguistic terminology uses the term "word-formation," or its synonym "derivation," in two senses. In one sense, "word-formation" is a name of certain morphological processes that take place in ethnic language. These processes consist in creating new words from words already existing in the lexical repository. Products of these processes are called derivatives or word-formations; while the words from which derivatives originate are called base words, or word-formation bases.

The other sense of the term "word-formation" refers to the linguistic discipline that studies word-formation processes, their results (that is, derivatives), formal units (morphemes) by means of which derivatives are constructed, and derivation rules. Word-formations belong to different classes of parts of speech. Depending on the category membership of the derivatives (*nomina — verba*), they have in sentences of the Polish language, similarly to *simplicia* (that is, inseparable words), syntactic functions of defining and defined elements. Because of the two-fold structure of derivatives, they are included into the syntagmatic type of linguistic signs, that is, such units of

language whose structures are composed of elements with certain semantic functions. Derivatives, because of their morphological separability, are opposed to amorphous, that is further indecomposable, words.

In word-formation research, as in other areas of linguistics, there are two approaches: diachronic and synchronic. What is characteristic of the former is the historism of word-formation phenomena, studying their evolution through the ages. On the other hand, word-formation from a synchronic perspective consists in describing the existing word-formation system of a particular language in a particular time, e.g. in the present or one of the previous epochs.

The aim of diachronic word-formation is to establish genetic relationships between base words and their derivatives, and discover development tendencies in word-formation processes. Researchers in synchronic word-formation omit this genetic aspect as they focus on establishing formal and semantic relationships between words co-existing in the lexical repository of the studied linguistic system. Some descriptions of the word-formation system of a particular ethnic language combine both of these aspects.

The primary relation on which synchronic (also called functional) word-formation focuses is foundation; this relation occurs between two forms of linguistic signs, or their two functions, of which one (form or function) implies the other. The conditioning form (or function) is called "founding," while the conditioned — "founded." In the case of the word-formation relation, the founded word is a derivative, while the founding one is the word that motivates the functioning of the derivative in the word-formation system. Besides the relation of foundation, the synchronic description of word-formation facts also covers motivational relations between co-existing related words (or forms). The relation of foundation links two words (e.g. *malować* "to paint" : *malarz* "painter"), while the relation of motivation links a series of words (forms) with a common morpheme, e.g. a root[1] or an affix. The following exemplify mutually motivating words or word forms: 1) *malować* "to paint," *malowanie* "painting," *malarz* "painter," *malarstwo* "paintings," *malowidło* "painting, mural," *malowanka* "coloring book," etc., or 2) *malarnia* "paint shop," *drukarnia* "printing-house," *farbiarnia* "dye-house," *kwiaciarnia* "florist's," etc. What the former series of words has in common is a common root, the latter — a common suffix.

It is not possible here to enumerate all variously understood tasks or the

[1] *Root* in linguistics is a word element that is formally and semantically inseparable; while *affix* is a word-formation morpheme which, together with a root, creates a complex, that is, separable linguistic element, e.g. a stem or a compound word.

whole of rich and often controversial issues of word-formation. However, it seems that the aim of word-formation analyses is, among others, to work out a general classifying schema within which it is possible to place a diverse set of empirically asserted facts. Despite the principal differences between the signalized approaches (diachronic and synchronic), certain issues are common to both areas of word-formation research. The main problem emerging in word-formation analysis is the relation of the form of a derivative to its meaning. It is associated with more detailed issues, such as: 1) the relation between a base word and its derivative; 2) category properties of a word-formation base; 3) the relation between the derivative's elements and their formal-semantic, and other, functions.

As a result of the thesis on the syntagmatic nature of word-formation structure, the derivative can be understood as a kind of syntactic structure, which has certain properties analogous to the properties of syntactic structures, e.g.: 1) the two-foldness of word-formation and syntactic structures; 2) the relation of subordination of certain elements (so called marginal) to others (so called central); 3) the presence of autosemantic[2] and synsemantic,[3] etc. elements. The enumerated properties of word formations imply their syntactic interpretation.

Word-formation, from a syntactic perspective, is understood as a kind of inter-morpheme syntax, which is analogous to inter-word syntax; inter-morpheme syntax is based on the assumption that the stem[4] of a suffixal derivative has a defining function, while the formant[5] indicates what is defined, in other words, what is the subject of defining. Thus elements of a formation have parallel functions to those of elements of syntactic constructions.

In accordance with W. Doroszewski's view (Doroszewski 1946), word-formation is an equivalent of an affirmative sentence, while its elements

[2]Autosemantic elements are independent linguistic units which have certain meaning even if they are used separately, that is beyond syntagmatic relations.

[3]Synsemantic words are auxiliary linguistic elements which do not have autonomous semantic functions, e.g. prepositions, conjunctions, etc.

[4]*Stem* is the word part that remains after separating the formant (e.g. an affix). The stem, similarly to the root, is an indicator of the lexical meaning of a particular word. What can be the stem is either a root (cf. *dom-* "house" : *domisko* "(large) house," or a root expanded by means of an affix (cf. *druk-* "print" : *druk-ar+nia* "printing-house," *-rzut-* "throw" : *od-rzut-owi+ec* "jet plane").

[5]*Word-formation formant* is a morpheme which creates certain specific semantic and syntactic categories (e.g. *nomina*, *verba*). According to linguists, the formant does not have a precise semantic function as e.g. the stem (c.f. note 4 above).

correspond to sentence elements (e.g. which are in the relation: subject — predicate, or subject phrase — predicate phrase). Treating the structure of a derivate as a parallel to the structure of a sentence raises certain objections, both logical and grammatical in nature.

Word-formations differ from sentences with the following logical and grammatical properties: 1) the name of a two-fold structure and the sentence do not belong to the same semantic category, and do not have the same syntactic function; 2) names refer to things in a broad sense, while affirmative sentences describe states of affairs, situations; 3) from the logical standpoint, affirmative sentences can be characterized by assertion, while names — cannot; 4) the meaning of affirmative sentences with assertion is a logical proposition, whereas names do not express logical propositions. Names are elements of sentences and can be contrasted with them.

Differentiating between the name and the sentence structures is based in grammar on the opposition of predication and determination, and the opposition of the sentence-creating function (Kuryłowicz 1960b) of the defining element (the predicate as *verbum finitum* or the nominal predicate, that is, a copular verb followed by the predicative complement) and the constitutive function of the element defined in the syntactic phrase. In other words, the central element of the sentence is its defining element (e.g. *człowiek* ***drukuje***[6] "person prints," *człowiek jest* ***śmiały*** "person is daring"); while the central element of the multi-word name is the defined element (e.g. *śmiały* ***człowiek*** "daring person," *drukujący* ***człowiek*** "printing person," etc.).

In word formation the hierarchical relation between elements of the formation is not as clear as in the sentence or the syntactic phrase. For the formant and the stem are not units of independent meaning, that is, linguistic signs (cf. *druk-* and *-arz* [*drukarz* "printer"] or *śmiał-* and *-ek* [*śmiałek* "daredevil"]). I am inclined to treat both morphemes of the formation (that is, the stem and the formant) as synsemantic elements which function as a kind of substitute for linguistic signs.

Word-formation researchers put forward the hypothesis that the formant is functionally subordinate to the stem.[7] It seems that the principle of

[6]The constitutive elements of the sentence and the syntactic phrase are marked here in bold.

[7]It is an implication of J. Kuryłowicz's view, cf.: "Le sémantème ou la racine du mot représente sa partie constitutive, les éléments accessoires ce sont les différents morphèmes synsémantiques ou les affixes (suffixes, préfixes, infixes)" (Kuryłowicz 1960a: 26).

subordination needs to be relativized to the opposition: the weight of the semantic function of the stem — the weight of the formal function of the formant. The formal function of the formant consists in that the formant determines the category of the formation, and assigns the formation to a certain class of parts of speech. Whereas the stem characterizes the class of objects to which the formation refers, and thus makes the meaning of the whole word precise.

If we assume that the stem is the central element of the derivative, and that the stem in the structure of a two-fold name functions as the defining element, then the stem's function would be analogous to the function of the defining element in the sentence, which would imply a parallelism between the word-formation and the sentence structures. However, I enumerated arguments against treating these two categories of linguistic signs as parallel.

From the alternative: the sentence or the syntactic phrase, I eliminated the former. Thus, it would seem that the word-formation structure is parallel to the structure of the syntactic phrase. However, the fact that this word-formation differs from the syntactic phrase, not only in linking morphemes[8] but also in that the functions of the formant and the stem change depending on the semantic type of the formation, cannot be neglected. For example, in semantically neutral[9] suffixal formations, the formant usually predicts something that is defined (e.g. sets of things, events), thus it has a semantic function parallel to the function of the defined element in the syntactic phrase, while the stem — to the function of the defining element, cf.:

druk + arz	śmiał + ek[10]
drukarz "printer"	śmiałek "daredevil"
↕ ↕	↕ ↕
<<drukujący człowiek>>	<<śmiały człowieky>>
"printing person"	"daring person"

In derivatives of expressive meaning, the formant as an indicator of a property (or a collection of properties) functions analogously to the function of the defining element, while the stem — of the defined element, cf.:

[8]In my opinion, linking the formant with the stem in word-formation needs to be of a different nature than the relation of the defined and the defining element in the syntactic phrase, because word-formation elements are not independent linguistic signs, while elements of the syntactic phrase have autonomous semantic functions.

[9]I oppose semantically neutral formations to formations with expressive tones.

[10]The formants *-arz*, *-ek* in the given examples correspond to the defined element in the syntactic phrase, e.g. *człowiek* "person."

pies + ek	ps + isko[11]
piesek ”small dog”	psisko ”large dog”
↕ ↕	↕ ↕
<<pies mały>>	<<pies duży>>
”small dog”	”large dog”

Such a situation does not take place in the syntactic phrase, e.g. *śmiały* ***człowiek*** ”daring person,” *mały* ***pies*** ”small dog,” *duży* ***pies*** ”large dog,”[12] etc.

Thus, deciding which element of the complex word is central, and which is marginal, and defining the semantic role of each element seem to depend on the semantic or the formal approach in the word-formation analysis. In the formal approach, what can be considered the central element is the formant, because it determines the type of structure, while in the semantic approach — the stem as an indicator of the characteristic (dominating) property of a referent. Because both elements of the formation have formal functions and also partially certain semantic functions, it is difficult to categorically decide which of the functions is superior.

The word-formation stem is treated by word-formation researchers as the main carrier of the lexical meaning of the formation, however the semantic function of the formant is not defined sufficiently clearly. Admittedly, word-formation deals with the conceptual role of the formant as an indicator of a certain class of notions of the extra-linguistic area. Because of this, researchers assign to the formant a certain semantic value that consists in ”abstractifying” the lexical meaning of the whole formation. Such an approach to the function of the formant does not sufficiently explain the formant's role, because it introduces at least two levels of abstractiveness. For there is yet another *abstractum* in the lexical meaning of the whole formation, that is, the ”abstractified meaning” of the formation (see Brodowska-Honowska 1967: 13). Thus, the questions if the formant contributes some part of its lexical meaning to the word-formation structure, and what is the type of this meaning, remain open.

Solving the problems presented here as examples is crucial as a syntactic analysis of derivatives involves certain interpretative operations, which are

[11]The formants -ek, -isko in complex words of expressive meaning correspond to the defining element in the syntactic phrase, while the stem corresponds to the defined element in the phrase. These correspondences are marked here with the up down arrow.

[12]The defined element, i.e. central in the syntactic phrase, is marked here in bold.

by some linguists called transformation. Other researchers, who explain the meaning and the structure of word-formations by means of expressions which are more formally developed, think that such a research approach is not a conversion of the word-formation structure into the syntactic structure.

Transformation rules of Polish word-formation are not yet developed. Polish derivatives cannot be transformed analogously to derivatives in languages whose word-formation system has a greater share of word formation composition (as in e.g. German). In Polish, derivatives are usually results of affixation. Still, a conversion of affixal structures into appropriate syntactic constructions is possible in Polish word-formation. However, it is not a transformation in the strict meaning of the word, but a quasi-transformation. Its bases cannot be formulated only by means of linguistic methods. The bases of quasi-transformation interpretation of word-formation facts of the Polish language need to be based on some methods of the linguistic expression analysis which are used in logical semiotics.

Semiotic approach to word-formation analysis

The semiotic approach to analyzing a two-fold name (that consists of the stem and the formant) deals not only with the name's relation to an object of the external reality, but also with the usage of a particular name in utterances of a particular language.

From the point of view of contemporary logic, sentences in the logical sense are fundamental semantic units. From the point of view of linguistics, the hierarchy of linguistic structures is established on account of the level of independence of these structures. The highest level of independence belongs to the sentence. It is a central element in syntax, similarly to a word form in morphology. Thus, using the syntactic interpretation in studying word-formation phenomena, I take the sentence to be the starting point of my considerations. The meaning of a derivative can be reconstructed on the basis of the sense of the sentences in which a particular formation is embedded, or by means of definition.

The first approach occurs when a particular formation that functions directly in linguistic texts is analyzed. The other approach can be applied when morphologically separable names are treated as isolated dictionary items, that is, as headwords defined in dictionaries. Both of these approaches can be realized simultaneously in order to verify the correctness of results of one or the other method.

Both the usages of names in utterances, and dictionary definitions indicate that a significant part of derivatives are polysemous and lexicalized[13] words, that is, words that do not have a morphologically transparent structure due to breaking the relationship between a given formation and the founding word. Determining the relation of the meaning of a morphologically separable name to the name's form often causes considerable trouble to the interpreter. For the meaning of a derivative is embedded in the form, which exposes some elements and conceals others. In order to determine the relation, it is necessary to have comparable elements, while the meaning and the form do not meet this condition; they are something else.

The notion of meaning can be compared to a (physical or conceptual) material to whom people give different shapes. For example, a quantity of a resource is a material from which certain (e.g. architectural) constructions are made, the constructions can have various forms. Human thoughts, which refer to the realities (or the notions) of the external world, also constitute a material which creates certain semantic constructions that are realized in various forms. These constructions need to be given a certain shape, that is, to be organized into appropriate schemas. A structure constructed by the interpreter cannot be isomorphic to the word-formation form. However, both of these structures (the proposed semantic one and the one functioning in linguistic reality) need to have a certain common property. It is either the identical meaning (= a set of properties), or the identical scope, that is the set of referents to which both structures refer. In order to differentiate between the two, I use the following working expressions: "semantic structure" and "formal structure." What I called "semantic structure" is precisely such a semantic construction which can be expressed by means of identical formal elements embedded in the derivative, but also elements not expressed through the form of the derivative. The semantic structure is not the same as the structural meaning. For the structural meaning results from linking the stem with the formant, that is, from the formal structure (= form) of the two-fold name. The semantic structure does not result from linking the name's formal elements. Also, it is not the same as the lexical meaning (updated each time) of a word-formation. The lexical meaning of each instance of a two-fold name

[13]Lexicalized words are the ones that underwent the so called process of lexicalization, which consists in that a morphologically transparent word loses its formal transparency due to breaking a link to the basic word, that is, the one that originated a given word form; this form is perceived by speakers as an inseparable linguistic sign, cf. e.g. *pogorzelisko* "site after fire, conflagration site," *oparzelisko* "boggy and swampy soil," etc.

is given in dictionaries, also in experiences and linguistic practice.

The semantic structure is a schema of the lexical meaning in the broadest sense, it is a representative of a certain class of lexical meanings (e.g. meanings indicating agents of actions, carriers of properties and states, places, sets of properties, etc.), thus it is abstractified from particular lexical meanings of a certain group of derivatives with close (or identical) meanings. In other words — the semantic structure of a series of word-formations is the construction which by nature is independent of subjective, specific and present realizations.

The schema of the semantic structure includes exponents which inform about the relation between an object and its representative property by means of the formant and the stem. Admittedly, the structural meaning informs us about a certain relation between a given object and its representative (i.e. dominating) property, but it does not communicate what type of relation it is. The relation is shown by the semantic structure which is presented in a more elaborate form than the form of analyzed name. The structural meaning of a formation, e.g. *kartoflisko* "potato field" can be presented as follows:

miejsce "place"	(?)	kartofle "potatoes"ŕ
-isko		*kartofl-*

The form of the semantic structure shows the relation of a referent of the word *miejsce* "place" and a referent of the word *kartofle* "potatoes;" for the relation is illustrated by means of the expression: a place where people grow potatoesŕ or a place where potatoes are grownŕ. Thus the schema of the semantic structure expresses *explicite* what is *implicite* included in the structural meaning of a word formation.

A word formation inherited through the language tradition and established by the language custom is conventional. For this form was shaped by many generations of speaking people. The semantic structure is also characterized by convention, but it is a convention determined by the interpreter. If a word formation in a particular sentence context can be replaced by the schema of its semantic structure, then the schema can be regarded as correct. For example, the word *brodacz* "bearded man" is treated interchangeably with the expression man with beardŕ, *nauczyciel* "teacher" teaching personŕ, *drukarnia* "printing-house" printing companyŕ, etc.

The semantic equivalents of the quoted examples are expressions in the form of syntactic phrases.[14] These phrases, similarly to word formations, do

[14]In a further part of the article I will use the sign "*E*" (= expression) instead of

not include formal exponents which would communicate the relation of a particular object and another object or property. We cannot explain, for example, the meaning of the derivate *pomarańczarnia* "orangery" by means of the syntactic phrase whose defining element is a prepositional expression a room with orangesí. This expression does not precisely inform us about the name's meaning. An adequate translation of the formation is: a room in which oranges are grownı́.

Since the Polish language has various alternatives for constructing expressions that represent the semantic structure of morphologically separable names, it is necessary to choose such a form of the expression that would meet the following criteria: 1) it should be expression E, whose form will least relatively obliterate the link between the semantic structure of name N and its structural meaning; 2) E should be a structure composed of parts parallel to elements of N, that is, comparable parts which will be made incomparable, i.e. semantically or formally diversified, parts visible. Hence E needs to expose at least some semantic elements of N, especially the ones that determine the name's structural meaning. Due to the mentioned reasons, it is postulated that the form of E is normalized. The postulate can be realized at least for some word-formation types of N which belong to the class of appellatives, that is, words corresponding to general names in a logical classification of names.

Thus, the basis for a quasi-transformation in word-formation is "structuralization" of lexical meanings of N, and more precisely — groups of semantically homogeneous derivatives. This operation enables us to present in schemas something as immeasurable and shapeless as meaning. Schemas E make the notion more concrete. It is a technical procedure which is verifiable by means of replacing Ns in particular utterances of the Polish language by semantically corresponding Es. The semantic correspondence of N and its potential substitute E is an equivalence relation in nature.

In accordance with views of linguists, a transformation of a certain type of language structure into a different type of language structure is based on the principle of equivalence, that is, semantic equivalence. The notion "semantic equivalence" needs to be elaborated on, because this relation can be understood in a different way.

There is no relation of semantic identity between N and E. N and E are

the expression "syntactic phrase," while instead of the expressions "morphologically separable name," "a word formation," "derivative" I will use the symbol "*N*." The syntactic phrase "*E*" is a form given by the interpreter to the semantic structure of a particular "*N*."

non-isomorphic as a result of *E* containing more language elements than *N*. These are, among others, elements so to speak "added" by the interpreter, and thus — redundant in relation to elements of *N*.

I assume that the relation of equivalence between *N* and *E* is a relation of their scopes (= denotations), that is, such that *N* denotes a set of references identical to the set of objects denoted by *E*. Equivalence as a symmetrical relation entitles interchangeability of elements of the equivalence relation. For example, compare the sentence: [...] *as far as the eye could see, there was a wide plain* ⇔ [...] *as far as the eye could see, there was a wide area whose surface was flat*.

I described the relation of denotative equivalence between *N* and *E* in a monograph[15] in which I formulated a nominal scope definition in a semantic fashion. The *definiens* of the definition is in the form of logical indefinite description, that is, a name expression which, by means of a description, refers to the same extra-linguistic objects as name *N* occurring in the *definiendum*.

Due to the mentioned reasons, we can regard *N* as an abbreviation of descriptions, in other words — a contracted description. Since *N* and *E* belong to the same syntactic category of names and have analogous semantic and syntactic functions in sentences of the Polish language, they can be treated as isosemantemic and isofunctional entities.

Grammatical analysis of internal relations in expressions *E*

In order to realize the postulate of normalization of the forms of *E*, which are to represent the semantic structure of a few word-formation types of *N*, we construct expressions

type 1 a)	człowiek, który **maluje**[16]	:**malarz**[17]
b)	człowiek, który wytwarza **modele** [18]	:**modelarz**[19]
c)	przedmiot, który **budzi**[20]	:**budzik**[21]

[15] I discussed this issue in more detail in: Judycka 1971.

[16] ["person who **paints**"] Words in bold are in a derivational relation; for example, in expressions "E," the word marked in a different font is a word-formation base for a particular "N."

[17] ["**painter**"]

[18] ["person who makes **models**"]

[19] ["**modeller**"]

[20] ["object that **wakes up**"]

[21] ["**alarm clock**"]

type 2 a) człowiek, który jest **śmiały**
or **śmiały** człowiek [22] :**śmiałek**[23]

b) **głęboka** woda[24] :**głębina**[25]

type 3 a) miejsce[26], na którym rosną **wrzosy**[27] :**wrzosowisko**[28]

b) miejsce, na którym gnieżdżą się **węże**[29] :**wężowisko**[30]

c) miejsce, na którym uprawiają **kartofle**[31]
or miejsce, na którym wykopali **kartofle**[32] :**kartoflisko**[33]

d) miejsce, na którym uprawiają **truskawki**[34] :**truskawkarnia**[35]

e) miejsce, w którym uprawiają **pomarańcze**[36] :**pomarańczarnia**[37]

f) miejsce, w którym sprzedają **kwiaty**[38] :**kwiaciarnia**[39]

g) miejsce, w którym wytwarzają **cegłę**[40] :**cegielnia**[41]

h) miejsce, w którym **przechowują**[42] :**przechowalnia**[43]

i) miejsce, w którym przechowują **bagaże**[44] :**bagażownia**[45]

[22] ["**daring** person"]
[23] ["**daredevil**"]
[24] ["**deep** water"]
[25] ["**water depths**"]
[26] The use of the word *miejsce* "place" in E signalizes that I treat the scope of the name *miejsce* "place" as a sum of scopes of other names, namely those which refer to various concrete parts of physical space.
[27] ["place where **heather** grows"]
[28] ["**moor**"]
[29] ["place where **snakes** rest"]
[30] ["**snake nest**"]
[31] ["place where **potatoes** are grown"]
[32] ["place where **potatoes** have been digged"]
[33] ["**potato field**"]
[34] ["place where **strawberries** are grown"]
[35] ["**strawberry field**"]
[36] ["place where **oranges** are grown"]
[37] ["**orangery**"]
[38] ["place where **flowers** are sold"]
[39] ["**florist's**"]
[40] ["place where **bricks** are made"]
[41] ["**brickyard**"]
[42] ["place where things are **stored**"]
[43] ["**storehouse**"]
[44] ["place where **luggage** is stored"]
[45] ["**left luggage office**"]

type 4 fakt, że się **naucza**[46]
or że się **naucza**[47] :**nauczanie**[48]

type 5 fakt, że się **naucza**[49]
or że jest **sprawiedliwie**[50] :**sprawiedliwość**[51]

From the linguistic point of view, E (1—5) are syntactic phrases with a characteristic structure.

The function of the defined element is fulfilled by a noun, or sometimes by the indefinite pronoun *somebody*, *something* replacing it. The defining element has the form of a subordinate clause,[52] that is, a clause that does not express a full proposition, but only a certain part of it. This part of a proposition is expressed by means of an attributive of the defined element, which creates, together with the defined element, an attributive syntactic phrase.

Subordinate clauses in the defining element are of different grammatical character depending on the introductory word. For example, the defining elements in expressions of the type 1, 2 are attributive relative clauses introduced by the pronouns *który* "which" or *kto* "who," *co* "that." The defining elements in syntactic phrases E of the type 3 are adverbial clauses of place introduced by the expressions *w którym* "in which, where," *po którym* "after which, where," *na którym* "on which, where."[53]

The semantic role of pronouns in word phrases E consists in that they refer to the defined noun but also, at least partially, acquire its meaning; thus, pronouns have a denotation analogous to the denotation of the name they replace in the defined element. A pronoun, e.g. *który*(e) (cf. types 1, 2) so to speak reflects the denotation of the noun it substitutes. The prepositional expressions *w którym* "in which, where," etc. (cf. type 3) have in principle an identical logical function, though differ from the pronoun *który*(e) in that they in some way locate things whose names are word-formation bases for

[46] ["fact that one **teaches**"]
[47] ["that something is **taught**"]
[48] ["**teaching**"]
[49] ["fact of being **just**"]
[50] ["that it is **just**"]
[51] ["**justice**"]
[52] Some linguists treat subordinate clauses as syntactic phrases. In my opinion, clauses of this kind can be regarded as special type of sentences.
[53] The expressions *po którym* "after which, where," *na którym* "on which, where," *w którym* "in which, where," etc. functionally correspond to the relative pronoun *where*.

nomen loci. For the prepositions accompanying pronouns inform, if the given objects are inside or on the surface of a given part of physical space.

From the point of view of linguistic syntax, the pronoun *który*(e) introducing an attributive relative clause functions as the grammatical subject of this clause; it refers back to its antecedent with which it agrees in gender, number and case. In this way the pronoun *który*(e) links the defined element with the subordinate clause in the defining element. *Mutatis mutandis* the above remark applies also to the expressions *w którym*, etc., though they function as adverbials of place in the adverbial clause in the defining element of *E*. The expressions *w którym*, *na którym* etc. are equivalent to the expression *w nim* "in it," which can be illustrated by a slightly deformed structure of the following:

takie miejsce, że w nim coś ***przechowują*** "such a place that things are stored in it" : ***przechowalnia*** "storehouse."

The following relations occur between components in the defining elements of syntactic phrases *E*:

type 1 — the relation of the verbal predicate in the form of a finite verb (*verbum finitum*) and the grammatical subject (the subordinate clause) expressed by means of the pronoun *który* "which;"

type 2 — the relation of the nominal predicate (a copular verb followed by the predicative complement) and the grammatical subject *który* "which" in the subordinate clause;

type 3 a, b — the relation of the (non-expressed in *N*) verbal predicate and the grammatical subject (a noun in the nominative case) of the adverbial clause of place;

type 3 c, d, e, f, g, i — the relation of the (non-expressed in *N*) verbal predicate in the form of an impersonal verb (3^{rd} person plural and the implicit ontological subject *ludzie* "people") with the object (a noun in the accusative case) in the adverbial clause of place;

type 3 h — the relation of the verbal predicate in the form of an impersonal verb (3^{rd} person plural and the implicit ontological subject *ludzie* "people") in the adverbial clause of place;

type 4 — the verbal predicate in the form of an impersonal verb (3^{rd} person singular);

type 5 — the nominal predicate in the form of a copular verb followed by the predicative complement.

The morpho-syntactic relations within the discussed *E*s are illustrated by means of a symbolic notation. The symbols are abbreviations of Latin

terms for particular classes of parts of speech and some of their grammatical categories:

"*Sub*" — the noun in the defined element of E;
"Sub_1" — the noun in the nominative case in the defining element of E;
"Sub_4" — the noun in the accusative case in the defining element of E;
"*Vprs*" — the verb in the finite form (the so called *verbum finitum* that determines the grammatical subject);
"*Vimprs*" — the verb in the impersonal form (3^{rd} person singular or 3^{rd} person plural) that does not imply the grammatical subject, but an implicit ontological subject;
"*C*" — the copula "is;"
"*Adj*" — the adjective in the function of the predicative or the attributive;
"*Pron*" — the pronoun *który* "which;"
"$Pron_{praep}$" — the prepositional expression *w* (*na*, *po*) *którym* "in (on, after) which;"
"*Conj*" — the conjunction *że* "that;"
" ŕ" — the double angle quotation marks encompassing the whole E;
"[ ]" — the square brackets encompassing the defining element of E;
"( )" — the round brackets encompassing elements introduced by the interpreter, that is, elements that are not signalized by the morphemes of N;
"*P*" — the relation of predication;
"*Nom*" — the *nomen* (as opossed to the *verbum*);
"*D*" — the relation of determination;
"*I*" — the first symbolism of grammatical relations
"*II*" — the second symbolism of grammatical relations
"*III*" — the third symbolism of logical relations.

I

type 1 a, b $Sub\ [(Pron)\ Vprs]$
type 1 c $Sub\ [(Pron\ Vprs)\ Sub_4]$
type 2 a $Sub\ [(Pron\ C)\ Adj]$
type 2 b $[Adj]\ (Sub)$
type 3 a, b $Sub\ [(Pron_{praep}\ Vprs)\ Sub_1]$
type 3 c, d, e, f, g, i $Sub\ [(Pron_{praep}\ Vimprs)\ Sub_4]$
type 3 h $Sub\ [(Pron_{praep})\ Vimprs]$

type 4 *Sub* [(*Conj*) *Vimprs*] or [(*Conj*) *Vimprs*]
type 5 *Sub* [(*Conj C*) *Adj*]

Thus formalized *Es* inform us about the semantic structure of word-formation types *N*:

type 1 — names of professionals, the so called *nomina professionis* (e.g. *nomina agentis*, that is names of either agents of actions or professionals who create objects, cf. — *modelarz* "modeller") and names of impersonal instruments, the so called *nomina instrumenti*;

type 2 — names of personal or impersonal owners of properties, the so called *nomina attributiva*;

type 3 — names of various parts of, either open or closed, physical space;

type 4 — names of actions, the so called *nomina actionis*;

type 5 — names of certain sets of properties, the so called *nomina essendi*, that is names of "having a quality."

Types 1-3 are *Ns* of specific classes of objects of extra-linguistic reality. Types 4 and 5 are names of certain classes of abstract concepts (onomatoids). What is characteristic for names of type 1—3 is that their formal structure as if makes them refer to things. Formations with the suffixes -*anie*, -*enie*, -*ość* do not meet this condition as they designate events (that is, actions, courses, processes, states, etc.) or sets of properties.

The central part of relations in the defining element of *E* is the predicate which implies other elements, e.g. determinants of the predicate such as the object, the adverbials, and the element that is required by the predicate, that is, the subject. The defining elements in *E* are mainly predicative constructions, although in some *Ns* that denote the same objects as *Es*, the predicate is not formally expressed by means of one of the word-formation elements. The relation of predication needs, however, to *implicite* lie in the meaning of certain *Ns* since their word-formation bases are the elements that determine the predicate or elements implied by the predicate. Such cases can be illustrated by means of the notation:

II

type 1; type 2 a; type 3 h, type 4 *Sub* [*P*]
type 1 c; type 3 a, c, d, e, f, g, i; type 5 *Sub* [(*P*) *Nom*]
type 2 b — which represents the relation of determination [*D*] *Sub*

If the semantem[54] of the word-formation base in the defining element of

[54]Semantem is the term given by linguists to the smallest semantic element of the root or stem of a word.

E is also a word-formation stem of *N*, then the syntactic role of the basic word can be assigned to the stem of this *N*. Thus, names derived from the word-formation base, which functions as e.g. the grammatical object in *E*, can be included in the group of *Ns* that are based on the stem of a noun in the accusative case, and thus — that are in the function of the grammatical object (cf. type 3 c, d, e, f, g, i).

By applying this approach, it is possible to distinguish between groups of *Ns* based on stems of the verb in the function of the verbal predicate, the noun in the nominative case, that is — in the position of the grammatical subject, the adjective in the function of the predicative complement (cf. type 2 a) or in the function of the attributive (cf. type 2 b), etc. In other words — derivatives can be systematized on account of the syntactic position and the syntactic function of their word-formation bases that are expressed *explicite* in syntactic phrases of *E* that are equal to a given *N*.

Logical analysis of internal relations in expressions *E*

From the linguistic point of view, schemas *E* have, as mentioned above, the form of word phrases, while from the point of view of logical semiotics — they are expressions of the form of (indefinite) descriptions. A syntactic phrase and a logical description share certain properties. The logical structure of description, similarly to the linguistic structure of a word phrase, is two-fold; the description consists of an expression which in logic is called a function sign, and the expression that is its argument. The argument, that is the first element as regards the order of occurrence of both syntactic categories, is a name that denotes a class of objects of extra-linguistic reality. Whereas the function sign, that is the second element of description, denotes functions, that is — properties and relations characteristic of sets of objects denoted by the argument name. In other words — the semantic role of the function sign consists in that it is the classification or relation sign of the argument name, that is — such an expression that enumerates properties and relations assigned to objects symbolized by the argument name. The argument of description is an equivalent to the defined element of the syntactic phrase, while the function sign — an equivalent to the defining element.

The structure of description is expressed in logic by means of a formula that consists of signs symbolizing the components of description. Instead of the argument name, the variable "X" is used, while the symbol "f" stands for the function sign. The expression consisting of the function sign "f" and the argument variable "X," and thus "$(f)\ X$," is not a complete formula of

description, which requires the operator sign - "η" for indefinite descriptions. The operator - "*eta*" distinguishes a given class of objects from the scope of any other objects. This operator is used to formalize indefinite pronouns (e.g. *ktoś* "somebody," *coś* "something," *jakiś* "a, some") or indefinite articles in ethnic languages that have articles. By binding the free variable "X," the operator "η" transforms e.g. the expression "$(f)\ X$" from a sentence formula to a description formula that describes a given class of objects with certain properties.

This is the general formula of indefinite description:[55]

$$\text{III } "(\eta\ X)f(X)"$$

This formula can be understood as follows: "some X having property f," or "some X that has property f," or "some X that is f-ish."

The syntactic phrase (cf. I, 1—5 and II) and the indefinite logical description (cf. III) are formalized from different points of view. The expressions (I, II) and the expression (III) illustrate different angles of approach to the relations they describe. The formula (III) is a sign of the function-argument relation between expressions that refer to things (or facts) and properties of these objects, while schemas (I, II) represent relations between appropriate linguistic signs.

A confrontation of the descriptive formula (III) with the schemas (I — 1 a, b; 3 h; 4) leads to the conclusion that the logical description (III) and expressions E with predication in the defining element have three signs each (cf. "η," "X," "f" with "*Sub*," "*Pron*," "V"). However, the formulas (I) and (III) are not isomorphic, since components of the expressions (I) belong to different areas of natural language. These are morpho-syntactic components of word phrase E or morphological components of N (the formant and the stem).

The formula of the function-argument relation does not precisely reflect the internal relations in E, since: 1) these relations are not only of the type function sign — argument relation; 2) the schemas E do not have a linguistic equivalent to the operator — "*eta*," since in everyday Polish indefinite pronouns are omitted. They do not function analogously to indefinite articles. The expressions: *jakiś fakt, że się naucza* "a fact that one teaches," *jakiś fakt bycia sprawiedliwym* "a fact of being just," or *jakiś fakt, że jest sprawiedliwie* "a fact that it is just" would be blatantly artificial. Also, what the formula

[55]See the formula of definite description with the operator — "*iota*" in Reichenbach (1967: 94).

of the indefinite logical description does not take into account is that the function sign is an expression composed of components which have semantic and syntactic functions and occupy certain syntactic positions.

The symbolism of function calculus is too simplified to be used to interpret relations in polymorphic structures of an inflexional language. An adequate method to analyze internal relations in complex expressions of natural language is K. Ajdukiewicz's interpretation. Ajdukiewicz's interpretation schema is isomorphic for complex sentences that he analyzed.

Discovering the relation of direct syntactic subordination of particular lexical units that compose E as well as establishing the role of their elements, and especially the word-formation base N, is possible due to applying the method introduced by K. Ajdukiewicz (1967a, b), who used the method to define certain notions which can be also useful in linguistic analyses, e.g. the notion of a proposition as the connotation of sentence, the notion of a translation of sentences of a certain type into other sentences, that is — the notion of transformation. The aim of the method was to interpret syntactically sentences with intensional expressions, analyze semantically intensional expressions and eliminate them from sentences of natural language. In Ajdukiewicz's opinion, the definition of connotation as a set of certain properties, adopted in traditional logic, is not satisfactory.

Because every complex expression (and hence, every sentence) is composed of elements that are organized in a hierarchy, defining the connotation of sentence involves indicating the syntactic positions of sentence elements and defining their syntactic role. Thus understood connotation is a function which establishes the correspondence between syntactic positions of words in the sentence and their denotata. Such correspondence is a proposition asserted by the sentence. In other words, Ajdukiewicz's definition of connotation takes into account not only the objective references of the words that compose the sentence, but also their syntactic position and role. The definition of translation is also based on the notion of syntactic position and the notion of denotation.

There is such correspondence between all elements of the transformed sentences and elements of the output sentence that elements of a given pair of sentences have relatively the same syntactic position and are mutually equal, that is — denote the same objects. According to Ajdukiewicz's views, every binary relation between linguistic expressions can be confronted with a class of ordered pairs of objects between which there is an analogous relation. This idea can be interpreted thus, that relations between pairs of linguistic signs reflect relations between designates of these signs. Some of

Ajdukiewicz's conceptions summarized here confirm certain intuitions of mine about linguistic interpretation of factual material.

N as a uniform linguistic sign meets the whole of denotative and connotative functions. The question arises if, and possibly how, these functions are realized by elements of *N*. The other question is what is the syntactic relation between the derivative and its word-formation base. In other words — if the relation is direct, or not. In order to answer these questions, I interpret some word-formation facts using the mentioned method for analyzing complex sentences.

As mentioned above, expressions *E* do not have operators which bind variables. However, it is possible to distinguish in each of the expressions representing a certain word-formation type the main operator and its consecutive arguments, from which one is the base word for *N*.

It is considered that the main operator is such a word that together with its argument constitutes the whole complex expression. The argument of the main operator and the operator itself are elements of the first degree in *E*. There are such arguments of the main operator that have structures composed of elements of the first, second, third and n degree. A description of the relation between *N* and its word-formation base consists in determining the syntactic position of the base word in *E* and the element of which degree this base is. Establishing the syntactic position of the base word by means of ordinary language would be a too complicated description. Thus, following Ajdukiewicz, I introduce the arithmetic symbolism which enables to show distant positions occupied by certain base words more clearly.

Natural numbers symbolize elements of *E*: "1" is the symbol of the whole expression *E*; "1,0" — the symbol of the main operator; "1,1," "1,2," etc. — the symbols of consecutive arguments. Numbers "1,1," "1,0," "1,2" stand for syntactic positions of the first degree; "1,2,0," "1,2,1" — of the second degree; "1,2,1,1," "1,2,1,0" — of the third degree.

There are two interpretation variants in the analysis of expressions *E*. The first is based on the analysis of structures of subordinate clauses, in which verbs together with conjunctions function as main operators. Cf. the sentence quoted by Ajdukiewicz:

"Caesar	believed	that	the	Capital	of	Republic	lies	on	the	Tiber"
				1,1,0		1,1,1	1,0		1,2	
1,1	1,0			1,2		1,3	1,4		1,5	

By analogy to the above example, I assume that the main operator of *E* is the verb together with the accompanying pronoun *który* "which," or the

expression *w którym* "in which," cf.:

1) malarz — człowiek malujący → człowiek, który maluje[56]
   1,1 1,0 1,1 1,0
2) śmiałek — człowiek, który jest śmiały[57]
   1,1 1,0
3) modelarz — człowiek wytwarzający modele[58] →
   1,1 1,0
   → człowiek, który wytwarza modele[59]
   1,1 1,0
   1,0,0 1,0,1
4) wrzosowisko — miejsce, na którym rosną wrzosy[60]
   1,1 1,0
   1,0,0 1,0,1
5) równina — obszar mający powierzchnię równą[61] →
   1,1 1,0
   → obszar, który ma powierzchnię równą[62]
   1,1 1,0
   1,0,0 1,0,1

The other possibility of interpretation is also a certain attempt at applying Ajdukiewicz's method, that is, such in which the main operator is not the verb with the pronoun (or the conjunction), and thus not the exponents of the relation between elements of *E*, but a noun in the defined element of the syntactic phrase *E*. What can be such a relation element is the word *miejsce* "place," the word p*rzedmiot* "object," etc. that informs that the expression (the defining element), which asserts something about a feature or property, remains in relation to something which has a meaning of locativity, objectship, etc. Generally, the functions of operators are taken over by unautonomous words, thus in such a case operators are relativized to a given expression. The precedent can be the fact that Ajdukiewicz assigned the role of the operator to a noun, cf.:

[...] the Capital of Republic [...]

[56] "painter" "painting person" → "person who paints"
[57] "daredevil" "person who is daring"
[58] "modeller" "person making models"
[59] "person who makes models"
[60] "moor" "place where heather grows"
[61] "plain" → "area having a flat surface"
[62] "area which has a flat surface"

1,1,0 1,1,1

From all nouns in the defining element in E, the most appropriate for the role of the operator is the word *miejsce* "place" because of its occasional character. This word is not actually used outside the context or an extra-linguistic situation; it can only occur in some complex expressions. For this reason it can be considered unautonomous.

By analogy, what are main operators are other nouns, e.g. *człowiek* "person," *przedmiot* "object," *fakt* "fact." Compare the following examples:

1) człowiek, który maluje[63]
1,0 1,1
2) człowiek, który jest śmiały[64]
1,0 1,1
1,1,0 1,1,1
3) człowiek, który wytwarza modele[65]
1,0 1,1
1,1,0 1,1,1
4) miejsce, na którym rosną wrzosy[66]
1,0 1,1
1,1,0 1,1,1
5) obszar, który ma powierzchnię równą[67]
1,0 1,1
1,1,0 1,1,1
1,1,1,0 1,1,1,1
6) miejsce, które znajduje się przed mostem[68]

[63] "person who paints"

[64] "person who is daring"

[65] "person who makes models"

[66] "place where heather grows"

[67] ["area which has a flat surface"] The expression *obszar, który ma powierzchnię równą* "area which has a flat surface" (cf. 5) can be considered an equivalent to the expression: *obszar, którego powierzchnia jest równa* "area whose surface is flat." This expression can be interpreted in a different way, e.g.:

obszar, którego powierzchnia jest równa
"area whose surface is flat."
1,0 1,1
1,1,1 1,1,0

The interpretation (5) is more convenient as it indicates which degree of the main operator's argument the base word is for the formation równina "plain."

[68] "place which is in front of a bridge"

(a) 1,0 1,1
1,1,0 1,1,1
miejsce, które znajduje się przed mostem
(b) 1,0 1,1
1,1,0 1,1,1

In the expression (a) the preposition belongs the operator, while in the expression (b) to its argument. Adopting the interpretation (a) is justified by the fact that the schema (a) agrees with other expressions interpreted according to the second variant of logico-syntactic analysis. For here the relation of transformation is analogous to the relation e.g. in the schema: *malarz* "painter" → painting personí → person who paintsí; *przedmost* || *przedmoście* "forebridge" → place being in front of a bridgeí → place which is in front of a bridgeí.

These schemas as wholes are treated as one-argument expressions. The arguments of expressions E have a complex structure and undergo further decomposition. The proposed interpretation is closer to linguistic analysis than the one presented as the first variant based on Ajdukiewicz's method. It preserves the dichotomy distinguishing between constructions of natural language and indicates the parallelism between the main operator, the defined element in the syntactic phrase and the formant X.

Conclusions

The usefulness of the interpretative method proposed in this article is illustrated by the following examples:

1) The word *kartoflisko* "potato field" has an analogous structure to the word *truskawkarnia* "strawberry field," although both *Ns* refer to different designates and differ in formants. Cf. *kartoflisko* → *miejsce, na którym uprawiają(-ali) kartofle* "place where potatoes are (were) grown," *truskawkarnia* → "place where strawberries are (were) grown."

Ns: *kartoflisko* "potato field" and *wrzosowisko* "moor" have an analogous, though not identical word-formation structure, since they are formed by means of the alternation formants *-isko* || *-owisko*. Whereas they differ in semantic structures. The word-formation stem of the *N wrzosowisko* is a noun in the nominative case, and thus in the function of the grammatical subject. Thus, the relation of the *N wrzosowisko* to its word-formation stem is different than the relation of *kartoflisko* to the base *kartofle* "potatoes." Hence the conclusion that *Ns* with analogous, though not equal formal structures are not identical on account of the semantic structure. This fact

is confirmed by the logico-syntactic analysis. The numerical symbolism of expressions E shows that the relation of the base word to its derivative can be a relation of the first, second, third degree.

2) The syntactic position of word-formation bases shows that *Ns* classified in the same word-formation category or the same semantic-structural type are not homogeneous in many cases. These can be e.g. derivatives based on the stems of parts of speech in the function of the sentence elements of the first degree, that is — the subject and the predicate, or formations based on the stems of parts of speech in the function of the sentence elements of the second degree, that is — the attributive and the object, etc.

The numerical method illustrates that names derived from nominal bases (of nouns, adjectives) have a more complicated semantic structure than deverbal derivatives. Hence, the method frees the interpretation from intuitive decisions on categoriality and regularity of word-formation structures.

3) A comparison of the formal structure of a given N and its semantic structure enables us to determine the function of the formant and the stem of N.

The formant is an equivalent to the defined element of the syntactic phrase. The defined element denotes a certain class of objects of the objective world, thus the formant signalizes the denotation of a given N.

In expressions interpreted by means of logico-syntactic method, the defined element functions as the main operator of one name argument. Thus, the formant has an analogous function to the main argument. Since certain operators have, among others, the property that they transform expressions into other expressions, the structural function of the formant is close to the function of the operator. The formant transforms the base word that belongs to a certain class of parts of speech into a formation that belongs to a different class of parts of speech, and thus nominalizes e.g. adjectives, verbs. In the case of *Ns* derived from nouns, the formant does not change the category of its word-formation base, but changes its denotation (cf. *kwiaty* "flowers" : *kwiaciarnia* "florist's," *modele* "models" : *modelarz* "modeller"), that is — gives the derivative a different meaning that the one the base word has, or stylistically modifies the meaning of the derivative (cf. *pies* "dog" : *psisko* "large dog," *kot* "cat" : *kocina* "poor little cat").

The stem, as an equivalent (and more precisely, a predictor) of the base word in the defining element of the syntactic phrase, classifies and specifies the objects denoted by the whole N by enumerating specific properties of these objects. Thus, this is what its semantic function, which J. Rozadowski (1904: 56) and W. Doroszewski (1952: 308) termed as distinguishing, consists

in.

The semantic-syntactic role of the stem can be characterized in such a way that it cumulates the functions of lexical components of the defined element in the word phrase. These functions are: syntactic functions of conjunctive pronouns (i.e. relative pronouns) and functions of morphological exponents (e.g. inflexional endings) of lexical units. In other words, the stem is a "mixture" of all the semantic and syntactic functions of N, which are expressed in N through formal means or which do not have morphological exponents in its formal structure. The stem is the element of N which signalizes its connotation.

The relation of the formant and the stem is analogous to the logico-syntactic relation of the main operator and its argument.

These remarks are not ultimate conclusions resulting from the analysis of word-formation material. Many issues should be discussed in greater detail. Also, the ideas presented here need revision. However, solving problems that arise in word-formation was not the aim of this article. The aim was to show that at least some of the issues are solvable by application of certain methods of logical semiotics. These methods may help to explain the facts of natural language that cause controversies. Further attempts to use Ajdukiewicz's theoretical conceptions may lead to other results than the ones already signalized.

Ajdukiewicz's papers that mainly contributed to this article were published after his death. He did not finish his research on the issues of syntactic analysis of sentences in natural language. He only presented the possibilities of this analysis, while the fact that I applied his method to interpret linguistic phenomena of a different kind further attests the potential of this method.

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ADVERBIAL DETERMINATION IN THE GĨKŨYŨ LANGUAGE

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The aim of this paper is an attempt at presenting relations within the predicate or, to be more precise, the relations between the head of the predicate and its determiners in the Gĩkũyũ language. As head, we take a *verbum*, which opens empty slots for slot-fillers. We tentatively assume that the slot-filler function in the adverbial position is primarily taken by an adverb (AD), and secondarily by any other part of speech, regardless of the semantic value of the *verbum* (transitive/intransitive[1]). Practically, in the latter case, a slot-filler role will only be performed by a noun (N) because both a verb (V) used as an object and an adjective (ADJ) move to the N category. Thus, the initial formula will be $V\ T\ N/AD$, where T expresses the interrelations of two (or more) elements of the predicate, i.e. the formal-grammatical or the categorical-semantic relations. Only such predicates in which the presence of both V and N or AD is presumed will be considered.

Hence, the paper will handle both structural relations (selective, syntactic information)and semantic relations (information) within the predicate (VP), with syntactic-semantic field borders defined as follows:[2]

[1]Like in other Bantu languages, the verb root in the Gĩkũyũ language is neutral. The transitiveness or intransitiveness is marked by adding bound morphemes to the root (see 5.2.).

[2]Abbreviations used further in the paper: R — relation, S — subject, A — attribute, P — predicator/ predicative determiner, M — adverbial, O — direct object, Adn—adnominal modifier, Adv — adverbial modifier, $f(\dots)$ — function, $CL14ADJR$

$VP \rightarrow \quad R\ (V,\ N) \qquad R(V,\ AD) \qquad R(V,\ N,\ AD)$

$R(V,\ N,\ N) \quad R(V,\ AD,\ AD) \qquad R(V,\ N,\ N,\ AD,\ AD)$

1. Separating a *VP* from S_n:

1.1. Solving a formal linguistic square based on a sentence (S_n) containing elementary parts of speech in natural relations:

S_1: *SAPM*: *mũndũ: mũkũrũ : arona : wega* „old person sees well"

S_2: *SPOM: mũkũrũ : arona : mũndũ: wega* „sees old person well"

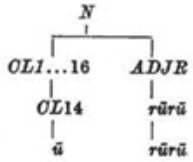
S_3: *SPOM: mũndũ : arona : mũkũrũ : wega* „person sees [the] old [one] well"

S_4: *POAM: arona :mũndũ: mũkũrũ : wega* „sees person old[O] well"

S_5: *PMOA: arona : wega : mũndũ: mũkũrũ*"sees well old person[O]"[3]

1.2. Formal-grammatical (+) and categorial-semantic (—) relations

— *N*; *N* consists of a prefix of nominal class *CL14* (*w*) and an adjective root *ADJR* (*ega*); the coding rule may be applied to all nouns of this type, e.g.



CL13NR — *N* (CL13 = *ka* + *NR* = noun root = *hora*), ≡ — if and only if . . . , → — transformation, *prep* — preposition, *p* — linking verb in a nominal-verbal construction, *V'* — auxiliary verb "to be", *P'* — predicative complement, *N'* — non-derivative abstract, *N"* — place name, *Q* — indirect object, *suf* — suffix, V_{suf} — derivative form of a verb created by adding a suffix, N_{suf} — noun with an inflectional morpheme — suffix, *Pron* — independent personal pronoun, *ob* — object pronoun, V_{pass} — verb in the passive voice, ∈ - belongs to a group (. . .), *con* — possessive particle.

[3]This sentence is a less correct variety of S_4.

a.

S_1: $N \pm ADJ \pm V - AD$

S_2: $ADJ \pm V\} \begin{matrix} -N \\ -AD \end{matrix}$

S_3: $N \pm V\} \begin{matrix} -ADJ \\ -AD \end{matrix}$

S_4: $V \left] \begin{matrix} -\left(\begin{matrix} N \\ \pm \\ ADJ \end{matrix}\right) \\ -AD \end{matrix}\right.$

S_5: $V \left] \begin{matrix} -AD \\ -\left(\begin{matrix} N \\ \pm \\ ADJ \end{matrix}\right) \end{matrix}\right.$

b. "+" to "–" ratio:

S_1: $NP + VP = 2 : 3$

S_2: $NP + VP = 1 : 3$

S_3: $NP + VP = 1 : 3$

S_4: $VP = (1) : 3$

S_5: $VP = (1) : 3$

1.3. Table illustrating the relations in S_1 — S_5

Determined constituent	Determining constituent				Actual relations
	N	*ADJ*	*V*	*AD*	
N	*X*	±	±	Ø	*N* : *ADJ*, *N* : *V*
ADJ	Ø	*X*	±	Ø	*ADJ* : *V*
V	–	–	*X*	–	*V* : *N*, *V* : *ADJ*, *V* : *AD*
AD	Ø	Ø	Ø	*X*	

The further discussion will regard the relations typical for *VP* : *V*: *N*, *V* : *ADJ*, *V* : *AD*.

2. Testing the functions of parts of speech (positional mobility of inflectional and derivational morphemes).

N with the function of: *S*: *mũndũ arona* "person sees"
Adn: *ngui ya mũndũĩrona wega* "the dog of the person sees well"
P: *mũthee aarĩmũndũ mwega* "the old man was a good person"
Adv$_1$: *ngoro irahũra thĩĩnĩ wa mũndũ* "heart beat in the person"
Adv$_2$: *ekire ta mũndũ* "he acted humanely"

ADJ with the function of: *S*: *mũkũrũ aikarire thĩ* "[the] old [one] lay (on the ground)"
Adn: *ngui ngũrũ yakomire* "old dog lay"
P: *mũndũ aarĩ mũkũrũ*"the person was old"
Adv$_1$: *mũndũ akororire ta mũthee* "the person coughed like an old one"
Adv$_2$: *mũndũ akororire ta mũkũrũ* (same as *Adv*$_1$)

V with the function of: *S*: k*ũona wega nĩ kĩndũ kĩega* "to see well is important"

Adn: *mũndũ wonaga oĩ (amenyaya) maingĩ* "a person who sees knows much"

P: *mũndũ arona* "person sees"

Adv: *aikare thĩ, akionaga* "he sat while seeing"

ADJ with the function of: *S*: *wega nĩ (ta) ũrĩa kũrĩ* "it is good as it is"

Adn: *makithi: "wega mũno"* "mark: very good"

P: *rĩu nĩ wega* "now it is good"

Adv: *ina wega!* "sing well!"

2.1.

	N	*ADJ*
S:	*mũndũ*……	*mũkũrũ* ……
Adn:	…… *ya mũndũ*	…… *ngũrũ*
P:	…… *arĩ mũndũ*	…… *arĩ mũkũrũ*
Adv_1:	…… *thũni wa mũndũ*	…… *ta mũthee*
Adv_2:	…… *ta mũndũ*	…… *ta mũkũrũ*

	V	*AD*
S:	*kũona* ……	*wega* ……
Adn:	…… *wonaga*	…… *"wega mũno"*
P:	…… *arona*	…… *ni wega*
Adv:	……*akionaga*	…… *wega*

2.2. Provisional conclusions: the adverbial function may be expressed by: nouns — in prepositional phrases, adjectives — in prepositional phrases and by moving to the abstract class[4], verbs — by adverbial participle. There are no adverbs proper.[5]

[4]In the Gĩkũyũ language, nouns are systematised by nominal classes marked by prefixes. The abstract class is the fourteenth nominal class.

[5]In the sentences above, the word *wega*, which functions as an adverb, is a noun derived from the adjective —*ega* "good," of the CL14ADJR type (see footnote 2).

3. Detailed analysis of ways of expressing circumstances and objects[6]

3.1. Expressing circumstances

I. ADJ = f(M)
a. (S)PM: (mũndũ) arona wega "person sees well"[7]
1. V – ADJ; ADJ = f(M) ≡ ADJ → N = CL14ADJR
b. PM: okĩrire na ũgũũta "he stood up lazily"
2. V – ADJ; ADJ = f(M) ≡ ADJ → N = CL14ADJR → prep N
c. P(O)M: ahakire (mũgate) thaigi nyingĩ "he spread butter thickly on bread"
3. V + (N) – N + ADJ; Adj = f(M) ≡ f(M) = N + ADJ
d. PM: akuire (maĩ) manyinyi "he carried little (water)"
4. V – ADJ; ADJ = f(M) ≡ (N) + ADJ
e. SpM: nyumba yuma nyũmũ "it was dry in the house"
5. (S) + V' + ADJ; ADJ = f(M) ≡ ADJ = f(P') → f(M)
f. PpM: acokire arĩ mũrwarũ "she returned ill"
6. V + V' + ADJ; ADJ = f(M) ≡ ADJ = f(P') → f(M)
II. N → f(M)
a. PM: tucokire na ihenya "we returned quickly"
1. V – N; N = f(M) ≡ N → prep N
b. PM: ũka narua! "come quickly!"
2. v – N; N = f(M) ≡ N = (prep N)
c. PM: oima ĩgũrũ "he was located high"
3. v – N; N = f(M) ≡ N = N'
d. P(O)M: endete kũrĩa maguta "he liked eating greasy"
4. V – (V) – N; N = f(M) ≡ N = f(O) → f(M)
e. (M)PM: gũkũ eyonire mũgeni "he felt a stranger here"
5. AD = V – N; N = f(M) ≡ N = f(Q) → f(M)
f. (S)PM: marua mandĩkĩrwo na karamu "the letter was written in pencil"
f_1. PM: araragia na mũgeni "he talked to a guest"
6. (N) – V – N; N = f(M) ≡ N → prep N and N = f(Q) → f(M)

[6]For my work, I mainly used Benson (1964) and Marek Gecak, Kirkaldy-Willis (1955). Substantial help and information was provided by Mr. Muturi Mukiria from Kenya, a native Kikuyu.

[7]Sample reading of the pattern: 1. Categorial-semantic relation of a verb and a noun ("–"); an adjective performs an adverbial function if and only if the adjective moves into the category of nouns with the structure: 14^{th} class prefix, adjective core.

g. P(O)M: agathathaire (njurĩ) kahora “he stroked (hair) gently”
7. V – N – N; N = f(M) ≡ N → CL13NR
h. PM: ekire ta mũndũ “he acted humanely”
8. V – N; N = f(M) ≡ N → prep N and prep = ta
i. PM: ekire maũndũ ma waana “she acted childishly”
9. V – N – N; N = f(M) ≡ R(N, N) = N’ con N
j. PM: njikaraga muawainĩ “I am staying at a hotel”
10. V – N; N = f(M) ≡ N → Nsuf and suf = inĩ
k. PM: akuirĩirĩ Nairobi “he died in Nairobi”
11. V – N; N = f(M) ≡ N = N”
l. PpM: acokire (arĩ) njamba “he returned as a hero”
12. V – (V’) – N; N = f(M) ≡ N = f(P’) → f(M)
m. (S)PM: kaana nikahanyukĩira ithe “child ran to father”
13. (N) + V = N; N = f(M) ≡ V → Vsuf and N = f(Q) → f(M) and suf = rel.
n. PM: ninguuka kurĩ we “I will come to you”
14. V – prep – Pron; N = f(M) ≡ N → Pron → prep Pron and prep = kurĩ.

3.2. Expressing object

I. Direct object:
a. PO: Arona mũndũ “sees a person”
1. V – N; N = f(O) ≡ N = N
b. PO: arona mũkũrũ “sees an old [one]”
2. V – N; ADJ = f(O) ≡ ADJ → N
c. Ndĩmũonire “I saw him”
3. V – N; N = f(O) ≡ N → ob
d. P(O)O: nĩangutha riitho “he hit me in the eye”
d_1 P(O)O: nĩanjohire moko “he bound my hands”
4. V – N1 – N2; N = f(O) ≡ N1¬ = f(O) → ob and N2 = f(O)
e. (S)PO: iciko nĩicoketio nĩ mũici “the spoons have been returned by the thief”
5. N + V – N; N = f(O) ≡ V ϵ (V – N) → Vpass and N ϵ (V – N) → prep N and prep = nĩ.

II. Indirect object:
a. PQAO: ngurĩire mũtimia wakwa mbuku “I bought my wife a book”

1. V – N + pron – N; N = f(Q) ≡ Q ϵ (V – Q – O) and V ϵ (V – Q – O) → Vsuf and V suf = rel.
b. PQO: ndimũgurĩire mbuku "I bought her a book"
2. V – N – N; N = f(Q) ≡ N → ob and V ϵ (V – ob – N) → Vsuf and V suf = rel.
c. PQO nĩ agutwarĩra karamu "he took you a pencil"
3. V – N – N; N = f(Q) ≡ N → ob – f(Q)
d. PQO: nĩ agutwarĩire karamu "he took a pencil for you"
4. V – N – N; N = f(Q) ≡ N → ob and V ϵ (V – N1 – N2) → Vsuf and suf = rel.
e. PQOA: ndirahe mũrata marũa ma mama "I give a friend a letter for my uncle"
5. V – N1 – N2 + N3; N = f(Q) ≡ N = N1 ϵ (V – N1 – N2 – N3¬)
f. SPQ: Njoroge akũhũrana na Komau "N. fought with K."
6. N – V – N; N = f(Q) ≡ V ϵ (N – V – N) → Vsufand N → prep N and suf = rec and prep = na.

4. Arrangement of functional values of slot-fillers in the syntactic fields[8]

Array: $a(V\ T\ N);\ b(V\ T\ N\ T\ N);\ c(V\ T\ N\ T\ ADJ);\ d(V\ T\ ADJ)$
Integer: $i = f(P);\ j = f(M);\ k = f(O);\ l = d(Q)$

$S_1 = a(V — N)$
$S_2 = a(V — prep — N)$
$S_3 = a(V — v — N)$
$S_4 = c(V — N — ADJ)$
$S_5 = d(V — ADJ)$
$S_6 = d(V — v — ADJ)$
$S_7 = b(V — N — N)$

i: = V; *if i: = V then goto* $S_{1...7}$
j: = ADJ; if j: = ADJ → CL14ADJP then goto S_1
if j: = ADJ → CL14ADJR → prep N then goto S_2
if j: = ADJ → N + ADJ then goto S_4

[8]Naming by the international programming language ALGOL 60 was adjusted to the needs of this analysis. Explanation of abbreviations not explained before: *array* — syntactic fields, *integer* — functional values of parts of speech, *if... then* — conditional branch instruction, *goto* — output instruction, : = — set functional value realisation for... .

if j: = ADJ → (N) *+ ADJ then goto* S_5

if j: = ADJ → v + ADJ then goto S_6

if j: = ADJ → v + ADJ then goto S_3 *vel* S_6

j: = N; if j: = N → prep N then goto S_2

if j: = N → then goto S_1

if j: = N → CL13NR then goto S_1

if j: = N → N_{suf} *then goto* S_1

if j: = N → v — N then goto S_3

if j: = N and V in V — N → V_{suf} *then goto* S_1

k: = N; if k: = N then goto S_1

if k: = N → ob then goto S_1

if k: = N → N nad (N) → ob_1 *then goto* S_7

k: = ADJ; if k: = ADJ → N then goto S_1

l: = N; if l: = N → N_1 *in V —* N_1 *—* N_2 *and V →* V_{suf} *then goto* S_7

if l:= N → N_1 *→ ob in V —* N_1 *—* N_2 *and V →* V_{suf} *then goto* S_7

if l: = N in V — N and V → V_{suf} *then goto* S_1

if l: = N → N_1 *in V —* N_1 *—* N_2 *then goto* S_7

if l: = N → N→ ob in V — N_1 *—* N_2 *then goto* S_7

5. Arrangement of functional values of slot-fillers in the semantic fields.

The formal-syntactic analysis shows that in places where the head of *VP* (the verb) triggers a certain form of the following constituent or where the form of the verb formally requires a following constituent, the phenomenon of grammatical determination takes place, which has earlier been indicated by the → sign. However, the situation becomes complicated at the semantic analysis of the relations — semantic determination — occurring within the *VP*.

5.1. In the adverbial group, the following subgroups may be distinguished:

I. 1. *V – wega*
2. *V – na hinya*
3. *V – narua*
4. *V – ĩgũrũ*

II. 1. *V – maguta*
2. *V – mũgeni*

III. 1. *V – (N) – thiagi myingĩ*
2. *V – (N) – ikuhi*
3. *V – (N) – manyinyi*

IV. 1. *V – ta mũndũ*
2. *V – maũndu ma waana*

V. 1. *(N) + v + nyumu*
2. *(N) : v – na heho*

VI. 1. *V – mukawainĩ*
2. *V – Nairobi*

VII. 1. *V(+v) – njamba*
2. *V (+v) – mũrwaru*

VIII. 1. V_{pass} *– na karamu*
2. *V – na mũgeni*

IX. 1. V_{rel} *– ithe*
2. *V – kurĩ we*

Out of these groups, no doubts are raised by the subgroup VI, where the locative case is created by a bound locative morpheme (*mukawa — inĩ*) or represented by a place name (*Nairobi*). These are pure adverbials of place, which is evidenced by the possibility to replace them with adverbial pronouns; cf. *njikaraga haha* "I am staying here," *ndĩrathire hau ira* "I went there yesterday." The latter example shows that the same rule is extended to adverbials of time; cf. *wekira ũtia njuma hwaiinĩ?* "what were you doing on Saturday evening?" A noun in the locative form is not governed by the preceding constituent and is connected with it by adjunction within context; the relational meaning of the noun is included in the bound morpheme or in the core itself. Hence, for the subgroup VI, the relation of the adjunction is important.

In the subgroup I, the adverbial function is fulfilled by a noun derived from an adjective or an abstract, i.e. names of features. An adjective taking the adverbial position requires it to undergo a formal change of class (adjective → noun), which means that its form is implied. The noun derived from the adjective as an adverbial of manner directly determines the verb, it narrows down its notional range, and assimilation of meanings takes place. In this situation, semantic determination cancels the grammatical one and the syntax of adjunction plays the important part.[9]

[9]Cf. *Itunda rĩ na mucano mũrũrũ* "the fruit tastes bitter" (lit. "[the] fruit has (=is with) taste bitter"): *itunda ni irũrũ* "the fruit tasted bitter" (lit. "[the] fruit had

An attribute (abstract) may also be connected with the verb-predicator by the preposition *na* — a free morpheme and a systematic indicator of the relation of both constituents of the *VP*. The same indicator is present in subgroups V and VIII, where it expresses a sociative attitude (see discussion below). Let us consider the following examples:

1. *Oima ĩgũrũ* "he was located high" : *gukĩria hinya* "to surpass in strength"

2. *Thiĩ na ĩgũrũ* "to go uphill" : *ahuhiria na hinya* "he breathed heavily"

3. *Ndege ĩĩ ĩgũrũ muno* "the bird is very high" : *uhoro ũcio wĩ hinya* "this matter is v. difficult."[10]

Ad a. abstract is used attributively, a complement proper directly determines the predicator-verb = verbal adjunction (obviously, the abstract in this case is not an instrumental object but an adverbial of manner).

Ad b. abstract used attributively, a complement (due to the presence the attitude indicator: relational complement) relationally determines the predicator-verb; however, this is also a case of verbal adjunction because the preposition is absorbed by the following (not the preceding) constituent, which is evidenced by the lexicalised form *narua*; cf. *ũka narua!* "come quickly!" (*rua* "recency, proximity of time" — *narua* "quickly, soon").

Ad c. Circumstances expressed predicatively: in the first sentence, a construction with a copula-personal pronoun was used, while in the second one — an adjectival relative construction.

It may be therefore assumed that the presence of a feature name (abstract) with the preposition *na* with the adverbial function is dictated by the requirement to specify relations within the *VP* — the necessity to emphasise the circumstances rather than the activity.

In the subgroup VIII, concrete words take the adverbial position. According to traditional rules, they would fulfil the function of an instrumental object (1) and a comitative adjunct. However, the context clearly implies the circumstances of the instrument and the accompaniment, which is why the nouns in this construction should be considered adverbials — particularly when facing the fact that the *VP* has a separate construction for a comitative adjunct (cf. *Njorge akũhũrana na Komau* "N. fought with K.;" *kũhũra* "to

bitterness").

[10] *Igũrũ* "sky," "altitude;" *hinya* "strength," "difficulty;" *uhoro ũcio wĩ hinya* lit. "[a] matter which is [a] difficulty."

hit"). Therefore, the verbal adjunction is in question here as well because the meaning range of the adverbial is contained within the range of the predicator (a pencil is for writing, a guest — for talking (Heinz 1965: 86 et al.)[11]), which is further evidenced by fixed phrases, usually tautologous, etymological figures; cf. *ecanũrire na gĩcanũri* "he combed himself with a comb," *ahakire nyumba rangi ungi* "he painted the house black" (*haka* "to smear," *rangi* "colour" = *haka rangi* "to paint").

In the subgroup V, the feature is expressed predicatively: in 1. with an adjective, in 2. with a prepositional phrase. In both cases, the predicative complement directly defines the subject of the construction, and the syntax of concord is expressed by the copula (in 1., by the predicative complement as well). A more thorough analysis of the context, however, allows for a conclusion that feature names perform the adverbial function here; cf. *nyumba yuma nyũmũ* "it was dry in the house (lit. "the house was dry"): *utukukũuma* "it was cold in the night" (lit. "the night was with cold").[12] Whether the feature name performs an adverbial function here is decided only by the analytical division of the sentence: *nyumba* || *yuma nyũmũ* = predicative complement: *nyumba yuma* || *nyũmũ* = adverbial.

More light is shed on the essence of the relation mentioned by the examples of the subgroup VII. 1. *Acokire* (*arĩ*) *njamba* "he returned as a hero," 2. *Acokire arĩ mũrũaru* "she returned ill," which, in the traditional view, both contain object predicatives with an additional emphasis by means of the copula *rĩ*, facultative in 1. However, in this case, *arĩ* does not perform the function of a copula but of a verb with an adverbial function "being (ill, a hero)." The emphasis put on the verb function of *rĩ* (and not the copula function) also results from a grammatical rule saying that if an adjective is a predicative complement after the 3. pers.*sg/pl*, the copula *nĩ* should be used, cf. *Mũrutani nĩ mũrũaru* "the teacher is ill;" this would also imply that there is actually not an adjective in 2., but a noun derived from a verb. The relational meaning of the complements discussed, proceeding from the context, leads us to consider them adverbials of manner (how did he return?). Therefore, this is also the case of a verbal adjunction and the attributive character of the complement is clear.

[11]The linguistic discussion by Heinz goes far beyond the structure of the Polish language.

[12]In the sentence *utuku kũuma na heho* the prefix *kũ* added to the verb is not bound with the subject by congruence but it rather expresses a locative meaning (*kũ* = locative class prefix), which already formally indicates the adverbial function of *na heho*.

A similar situation arises in the subgroup II, for the function of *maguta* in the sentence 1. *Endete kũrĩa maguta* "he liked eating greasy" (lit. "grease") should not be interpreted as accusative but rather as instrumental ("(with) grease") without the preposition *na* (cf. subgroup VIII); in other words, it should be interpreted as an adverbial of manner. In contrast, in the sentence 2. *Gũkũ enyonire mũgeni* "he felt a stranger here," the context situation is analogical to the subgroup VII but without additional grammatical morphemes. The latter construction is also similar to subgroups IV. 1. and 2. In the subgroup IV, the sentence *athekire ta mũndũ* "he acted humanely" (lit. "like a human" involves an adverbial of manner expressed by a comparison (ta = like). This synsemantic model could, as a last resort, be also used in the construction II. 2; however, in II. 2., the complement, being nearly an attribute (a noun derived from an adjective), does not require additional semantic marking. In IV. 1., the complement function is performed by a concrete noun close to an apposition (cf. *we o ta mũndũ* "he like a human"), which requires an appropriate marker to express the adverbial function.[13]

Grammatical determination is dictated by the relative form of a verb used with a locative meaning, cf. IX. 1. *Kaana nikahanyukĩire ithe* "the child ran to the father." In spite of a clear case assignment, there is no object in the sentence, which is evidenced by the use of a relative form for expressing location when intransitive verbs are used: *nĩndarutaga Kamau* "I used to teach Kamau": *nĩndarutanaga* "I used to teach" (intrans.): *nyumba ya kurutanĩra* "a room for teaching in (a schoolroom)" (Marek Gecak, Kirkaldy-Willis 1955: 101).

The locativeness is also expressed with the preposition *kurĩ*, cf. IX. 2. *nĩngka kurĩ we* "I will come to you," and that formally, for *ku-* is a loc. cl. 15b prefix.

5.2. The direct object raises no doubts. The noun performing this function determines the predicator directly and attributively; cf. *arona mũndũ* "sees a person", *ndĩmũonire* "I saw him." When there is an adjunct of agency, an additional synsemantic morpheme is present; cf. *iciko niicokietio nĩ mũici* "the spoons have been returned by (=*nĩ*) the thief."

A noteworthy fact is that two objects (an object proper and a pronoun performing the function of an object) are necessary in the case when the activity is related to a body part of another person, cf. *nĩangutha riitho* "he hit (me in an) eye" (meaning "he hit my eye"), which accounts for

[13]The sentence may also be expressed by the construction VII. 2. *ndĩreigua haha ngĩ mũgeni* "I feel a stranger here" (lit. "I feel here I am a stranger").

grammatical determination.

Another case of grammatical determination would be the following rule, if followed rigorously: if there is an object after a verb with the tense marker *-ra-*, the pre-prefix *nĩ* is not used (in the verb); cf. *ndĩragura giti kieru* "I buy a new chair;" *nĩndĩragura* "I buy." The informant, however, did not see the sense of following this rule, which is why this construction was excluded from this study (see Marek Gecak, Kirkaldy-Willis 1955: 21).[14]

5.3. The indirect object is clearly grammatically determined when the verb takes a derivative relative form; cf. *ngurĩire mũtimia wakwa mbuku* "I bought my wife a book;" *ndĩmũgurĩire mbuku* "I bought her a book." It is, however, not grammatically determined when it is unnecessary to use this form; cf. *nĩ agutwarĩra karamu* "he took a pencil for you." The relative form is basically always used to emphasise the aim of an action (cf. the English prepositional object).

Grammatical determination is also present in the construction with a derivative reciprocal form of a verb; cf. *Njoroge akuhurana na Komau* "N. fought with K."

CONCLUSIONS

The essence of the reciprocal formal-grammatical and categorical-semantic relations of *VP* constituents in the Gĩkũyũ language is basically as much as the issue of semantic relations between the constituents of the predicate. This is because the phenomenon of grammatical determination, which in the case of adverbials is created by formal syntactic means (such as requirements to transform an adjective into a noun), is cancelled in the case of direct relations attribute: attribute (direct determination) but works if relational determination takes place, emphasised by the derivative form of the predication-verb (relative, reciprocal) in constructions with an object or adverbial.

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[14]Determining the function of the pre-prefix *nĩ* is v. complicated and requires multi-level research (Ndumbu, Whiteley (1962: 169f), Barlow (1927).

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FUNCTIONING OF METASIGNS IN FRENCH TEXTS

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The aim of this paper is to examine the functioning in texts[1] of signs used in material supposition. They have some features characteristic for the functioning of certain signs in real supposition, but beside that they also have other features, typical to them only. It seems justified to treat the latter as linguistic units having a specific syntagmatic position in a text — keeping in mind the difference between language levels, which distinguishes them from signs used in real supposition.

Let us begin with a terminological clarification: when writing about signs in material supposition, I will sometimes use the term *metasign*, which is used in literature on logic also for some signs used in real supposition, such as *substantif* or "the first word of *The Tyger* by William Blake", etc. I am doing this in order to avoid the inconvenient, although more precise term "sign used in material supposition", or "quotational name". As regards words like *substantif* (in real supposition!), they will remain beyond our interest: their functioning in texts does not differ from the functioning of such words as *table*, *vertu*, *pitié* (used in real supposition!).

It is universally accepted that the essence of metasign is, generally speaking, that instead of referring to extratextual reality and designating certain items (in this case stemming from nouns), a given linguistic form

[1]The deliberations of the author, who is a Romance languages specialist, are illustrated by French examples. The text was originally in Polish, but in some cases, Polish examples would not properly reflect the differences between the discussed constructions.

designates itself and items isomorphic with it. These two characteristics, namely isomorphism of a sign and its *designatum* and signifying itself by a sign are unobservable in signs used in real supposition. As the primary semantic function of a noun is to designate items,[2] we can assume that — from the semantic point of view — metasigns are characterised as nouns. On the other hand, they occur in the syntagmatic positions in which nouns often appear — the only position they do not occur in is in a simple predicate.

The metasign phenomenon has some common features with several well-known phenomena, which only seemingly have nothing to do with the use of signs in material supposition. The existence of a metasign in a text can be treated as an indication that the speaker used one of the meanings of the sign. According to this concept, each linguistic element would have to be treated as a polysemic unit. This would cause the need to distinguish between polysemy *sensu stricto* and polysemy *sensu latiore*. In the narrower sense, "polysemy" would mean, in line with the linguistic tradition, "the fact that a word or expression has several meanings" (Gołąb, Heinz and Polański 1968, 432); compare e.g. "crane" and "wood" in English, or "racine" and "navet" in French. Polysemy *sensu latiore*, as opposed to polysemy *sensu stricto* — which is limited to only some elements of language — is a universal phenomenon, as it refers to all language signs without exception. In both cases, we can speak of a coexistence of several meanings related to one sign, of which only one is used in the text. In both cases, it is the context that decides in which meaning the word is used. The context acts as a selector of meanings of a polyseme alternating in texts. As regards metasigns, the following contexts are possible:

— introductory words (abbreviation: 'I'), such as "le mot", "l'expression", "le substantive", "le syntagme", "la phrase", "la forme", "le nom", "le verbe", etc., e.g. "le mot *table*", "la forme *chantent*", "le nom d'*arbre*", "le verbe *finir*", "l'expression *être pris de court*", etc.

— metasigns may be introduced in 'definitional' sentences such as:

"XY *signifie* (*s'écrit*, *se prononce*...)...", e.g.

"*Table* est un substantive".

"*Victoire* signifie *avantage remporté sur les ennemis*".

The difference between the construction of the two types consists only in the material existence or non-existence of a term introducing a metasign in a text. However, where this word appears, we can omit it (under the condition that the semantic characteristics which it contains and which

[2]I use the concepts of semantic and syntactic function in line with their usage by Jerzy Kuryłowicz (Kuryłowicz 1960; Heinz 1957: 8—10).

make us interpret the word following it as a metasign are present in the context which is left, to avoid ambiguity), and where it does not exist, it may be introduced. In this case however, although the metasign occurs in the syntagmatic position typical for nouns, there is also no predeterminant[3] when the metasign is used in the general sense, not relativised by any attribute. However, any attribute of a metasign entails the use of a predeterminant: "Votre *fiche-moi la paix!* me semble tout á fait déplacé". "Le *tous* aristotelicien n'est pas exactement le même que celui de la logique modern".

In a construction with an introductory element (abbreviation: 'I—*M*'), there are certain semantic limitations concerning the right choice of 'I', depending on the grammatical nature of the metasign. It is also worth pointing out that where the metasign is a word which in the real supposition is characterised as a noun, there is a tendency to use it after the 'I' without a predeterminant: "le mot *table*", and not *"le mot *la table*". The contexts in which a metasign (used without an 'I') is preceded by an indefinite article are also relatively rare. As such cases do exist, however (cf. below), it seems relevant to speak of a three-tiered system of predetermination of metasigns:

— metasigns with no predetermination;
— metasigns predetermined by an indefinite article;
— metasigns predetermined by a definite article, indicative pronouns, possessive pronouns, etc.

It seems that the three-tiered system of predetermination of nouns-metasigns is something exceptional compared to the two-tiered system of predetermination of nouns used in the real supposition.

The method described above can be used for introducing metasigns which in the real supposition represent all grammatical types of signs, namely both synsemantic and autosemantic words, verbal, nominal, and relational elements, single words and whole constructions composed of several words. Together with the introductory words, metasigns can form one of the following constructions: "le mot *pitié*" (I *M*), "le mot de *pitié*" (I de *M*) and "ce mot, *pitié*" (I, *M*).

The first construction is the closest to the classical appositional constructions with the second element being a noun and a structure "Noun_1 — Noun_2". However, it should be distinguished from some combinations of two nouns typical for the language of advertising and for colloquial language, formally identical to it (on the surface) but divergent in the deep structure,

[3]By this term I understand articles and all kinds of pronouns of adjectives (cf. Gougenheim 1963: 63—70).

namely "papier toilette", "bifteck minute", "probléme lodgement", "question vacances". Although their surface structure is typical for direct determination,[4] these expressions in fact represent a relational determination, as proved by the following transformations showing their deep structure: "papier de toilette", "bifteck á la minute", "probléme du lodgement", "question des vacances". What is unacceptable, however, is a transformation typical for constructions containing a direct determination in the deep structure: *"ce papier est toilette", *"ce bifteck est minute", etc.

A transformation of constructions containing a metasign (I *M*) gives the following result: "ce mot est *table*" ("le mot *table*"), "cette forme est *chantent*" ("la forme *chantent*"), "ce verbe est *finir*" ("le verbe *finir*"), just as appositional constructions with both parts in real supposition, e.g. "Paris est une ville de trois millions d'habitants" ("Paris, une ville de trois millions d'habitants").

Among the various types of constructions with direct determination, the closest to constructions with a metasign seem to be "le soldat citoyen", "Monsieur Hérard" and "M. Duroc, le directeur commercial de l'enterprise". A syntagm with a metasign differs from the construction of the first and second type only by a small but distinct pause between 'I' and 'M'. In terms of accent and melody, the construction "le soldat citoyen" is identical with the syntagm composed of a noun and an adjective "noun + adjective", e.g. "la maison blanche". On the other hand, this pause in the construction 'I *M*' is less distinct than in the semi-predicative construction of the latter type ("M. Duroc, le directeur commercial de l'enterprise"). In order to omit the 'I' in a sentence where the context is sufficiently unambiguous, the pause is significantly prolonged after the word directly preceding the metasign.

As regards the external representation of the construction in question, both the introductory term and the metasign can perform this function — this is possible only in appositional constructions where the defining element is preceded by a predeterminant (e.g. "M. Durand, un des plus importants grossistes de la ville"), where there is a proper name in the function of the defined element (e.g. "sa femme Nicole" or "le roi Charles V"), as well as in nominal constructions such as "le parfum *Mirage*", "les tulipes *Rêve*", etc.

It is hard to establish which words used in the said type of construction make us interpret the following word as a metasign, and which do not. It seems that we can order them according to the semantism of the basis, with the extremes being the construction "le mot *mirage*" on the one hand and

[4]For the definition of direct and relational determination, cf. Heinz 1955: 35—39.

"le parfum *Mirage*" on the other.

In all cases, the relation between the word in the second position, the defining element, and the defined element is the same, which is reflected in identical transformations. The differences between the individual constructions concern only the semantism of the defining basis, therefore it seems that we cannot distinguish several types of metasigns on these grounds, as done by Leon Koj (he calls them 'quotational names', cf. Koj 1964), as the difference does not lie in themselves but beyond them. If it was possible to make a division within the class of metasigns according to differences in the context, nothing would prevent us from distinguishing not three but six types of metasigns:

"le phonéme *p*"	"le syntagme *prendre la mouche*"
"le morphéme *bel-*"	"la proposition *Pierre travaille*"
"le mot *beau*"	"la phrase *moi, je travaille tandis que toi, tu dors*".

It seems possible to make a division of metasigns when examining the relation of signs used to create metasigns in their real supposition to extratextual reality. In this context, we can distinguish two groups of metasigns:

— metasigns stemming from signs, which, when used in real supposition, directly correspond to certain segments of extratextual reality, e.g.: "table", "rouge", etc.

— metasigns stemming from elements of language which, as long as used in real supposition, do not correspond directly to anything in extratextual reality.

This is the case with signs such as "brr!", "psst!", as well as those elements of text which perform a diacritical function (Zawadowski 1959: 18), e.g. individual sounds of which the word "table" is composed. In the case of these signs, substantivization is equivalent to the use in their material supposition, e.g.:

"Ce *psst* n'a été entendu que par moi".
"Son *aïe!* nous a fait sortir du silence".
"Il prononça un *r* caractéristique, propre aux Parisiens".

Apart from the 'I *M*' constructions, *another* frequently used construction is 'I de *M*'. Among the constructions which do not contain metasigns, it corresponds to the group "Noun_1 de Noun_2", with its primary function being

relational determination. In transformation, it gives us "Noun_2 dont Noun_1", e.g. "la maison de mes parents" — "mes parents dont la maison". The secondary function is the introduction of elements in direct determination. One of the uses of this type of construction is when it introduces a metasign. While the 'I *M*' construction has not exhibited any restrictions on the part of the metasign and was characterised by a maximum range of use, the 'I de *M*' construction is not usable for some metasigns (e.g. those which stem from the personal form of a verb — *"la forme de *chantent*"), and cannot occur in some contexts, e.g. *"Le mot d'*arbre* est pensé différement par un botaniste et par un bûcheron". Among the expressions built along the 'I de *M*' pattern there are also some ambiguous ones, e.g. "mot de tendresse".

Let us now compare constructions with a metasign with other appositional constructions, with both elements in real supposition. Namely, the elements of the latter constructions can be transposed in most cases:

"Monsieur Durand, président de la Société des Charbons" —
"Président de la Société des Charbons, Monsieur Durand..."

In constructions containing a metasign, the order of elements is fixed: the metasign is always in the second place.

An appositional combination of two nouns in real supposition constitutes a relation of determination, the elements of which, when examined in isolation from the construction in question, can be either in the relation of inclusion ("M. Durand, homme de confiance du patron") or exclusion ("le roi soleil"), or overlapping (when there are two synonyms "Varsovie, capitale de la Pologne"). This leads to a distinction of two types of determinations, from the point of view of the determined element: narrowing and non-narrowing determination. From the semantic perspective, in this semantism the narrowing determiner has some characteristics which the determined element does not have, while the non-narrowing determiner only accentuates some selected characteristics contained in the *determinatum*. In constructions containing a metasign, the determination is always the narrowing one.

If we accept that a metasign is a specific kind of noun, we should say that it has a secondary syntactic function in appositional constructions. Does it not make its semantic function secondary as well? If we adopt this premise, we should state that it equals an adjective in the function of an attribute, both syntactically (secondary syntactic function of the appositive noun equals primary syntactic function of the attribute adjective) and semantically (secondary semantic function of the appositive noun equals

primary semantic function of the adjective). The problem is related to the function of the appositive noun.

In Polish linguistics, and in relation to the Polish language, there are two approaches to appositions. When examined beyond the system of case forms and under the assumption that the semantic function of a noun used as an apposition is the same as of an attribute adjective, they are considered formations of secondary semantic nominal function. As in addition there is the secondary syntactic nominal function, equalling the primary syntactic adjective function, there is a basis for equal treatment of an attribute adjective and of an appositive noun. However, when a noun apposition is treated as part of the case system, we cannot speak of a secondary semantic nominal function (= primary adjective function). Apposition is thus placed among the other grammatical cases, which, although syntactically being determiners, have not lost their semantic primary nominal function.

It seems that the problem of the function of semantic apposition should be treated differently in relation to the French language. In this case, we can speak of a primary semantic function of a noun when it is preceded by a predeterminer; it becomes secondary when the predeterminer is omitted. The same is reflected in the syntactic dimension. Nominal elements with a predeterminer (as well as proper names) can externally represent a whole appositional construction, while nominal elements without a predeterminer, used as apposition, cannot externally represent the whole and become more similar to adjectives. Constructions with a metasign belong to the first type, so it seems reasonable to treat metasigns as forms with primary semantic nominal function and secondary syntactic function.

Metasigns are close to proper names, although they are not identical. Firstly, there is no context into which we could not introduce 'I' before 'M'. Therefore, the fragment of a text in which the metasign is present can be interpreted as an elliptical construction. Proper names, on the other hand, are always a closed whole, without any element being omitted. Besides, they are not related to any kind of context, as it is the case with metasigns. Secondly, metasigns are relatively rarely used in constructions with relational determination, while proper names are not subject to any such restrictions.

There are two characteristics of metasigns particularly worth pointing out, related to forming the plural form and to the grammatical gender. On the one hand, the form corresponding to plural form in real supposition can correspond to singular in material supposition, e.g. "les travaux" — plural in real supposition, "le mot *travaux*" — singular in material supposition. On the other hand, only the metasigns without an explicitly expressed introductory

element can freely take the plural form. It is impossible to express the plural form morphologically in the following construction: *"deux mots *table*" — instead, we use "le mot *table* (répété deux fois)".

The metasign keeps the masculine form regardless of the grammatical gender of the initial form:

"Ce *table* que vous avez dans votre texte..."

What is interesting, when there is a feminine 'I' for a metasign which in real supposition is a part of speech which is in accord in gender with the determined basis, the metasign may keep the masculine form, etc. "la forme *haut*".

Metasigns are a typical phenomenon for the *discours* and do not exist on the *langue* level. Therefore, they cannot be compared with lexemes existing in *langue*. While the former have fixed relations to extratextual reality, namely they denote things, lexemes do not have a specified relation to reality, and they become specified on the *langue* level by grammatical morphemes characterising a lexeme as a part of speech. Every lexeme can be the basis for initiating a derivational process, which is excluded in the case of metasigns. As opposed to the class of nouns used in real supposition, metasigns constitute a set of signs which are hardly varied semantically. This set lacks units which could be the counterparts of *nomen collectivum*, *nomen actionis* or *nomen agentis*.

All in all, metasigns function similarly as proper names but constitute a very special language unit with distinctive characteristics.

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SIGN — SYMBOL — ALLEGORY

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The main point of this paper is logical in character. We intend to offer an explication of the term "sign" — which, to be sure, is merely one of the indefinitely many possible explications of the term's meaning — and to consider, in part II, several of its consequences for the semiotics of art. Hence, we will not try to settle any substantive issues in semiotics directly or construct a particular theory of signs (or a part of such a theory) in order to pit it against other theories in the field; nor are we going to describe the results of empirical semiotic research based on some such theory. We will merely give a more rigorous expression to some theoretical intuitions, mostly those concerning the notion of sign, by explicating them in terms of more precise concepts. Naturally, to explicate an intuition is not only to report or articulate it, but also to make it precise, retain some of its elements while discarding the others, and to reconstruct it.

We do not mean to suggest, however, that this kind of inquiry is of no substantive scientific interest, being of significance only to philosophy. For we believe that if the subject of a logical reconstruction consists of interesting and theoretically fruitful intuitions then such a reconstruction indicates, at the very least, that the intuitions in question deserve to be developed into a full-fledged scientific theory. Also, more often than not, a logical reconstruction suggests how to go about constructing such a future theory and, in the limiting case, may even form its core.

I. An Explication of the Notion of Sign

1

It seems platitudinous to claim that every work of art is a sign or a system of signs (a complex sign composed of some more basic signs). Yet it is mainly from this platitude that we attempt to derive some consequences in part II of this paper. Indeed, the statement in question does not imply anything interesting when the word "sign" is taken in its ordinary meaning, which is the product of fusing a haphazard collection of various conceptions into a single eclectic whole; on this interpretation, then, while perfectly true, the statement is utterly trivial and uninteresting. Our aim in part I is to select from this wide range of meanings a single concept with a well-defined connotation.

One can carry out this task in a variety of ways. Given the aim of this article, it would make sense to explicate the notion of sign as a notion that belongs to the conceptual apparatus of the humanities. This does not imply that we believe that it would be impossible to take this or that natural-science notion of sign and apply it to art, or to use a notion general enough so as to be neutral with respect to the methodological divide between natural science and the humanities, but it is only natural that a reconstruction of such a generality would yield a relatively small number of consequences concerning works of art.

Our point of departure, therefore, is the assumption that the *explicandum* (the notion of sign) should be construed in terms of concepts taken from the humanities. However, this assumption does not settle anything as long as we remain silent on the vexed question of the methodological differences between the humanities and natural science, especially those concerning their conceptual resources.

This is not the place to analyze this problem.[1] Suffice it to say that our position toward it can roughly be captured by the following claims:

1. The thesis of anti-positivist methodological naturalism: The basic methods of investigation are common to natural science and the humanities. We take these methods to overlap, to a degree, with those posited by Popper's hypothetism.

a. Every system of empirical science comprises, besides analytic sentences, only hypotheses; hypotheses can be theoretical or observational in character.

b. A conflict between a theoretical hypothesis and an observational hypothesis need not lead to retaining the observational hypothesis in favor of the theoretical one.

[1]For a more detailed discussion, see Kmita, Nowak 1968.

c. All descriptive terms, be they theoretical or observational, are on a par with respect to reference; *pace* instrumentalism, the language of empirical science is not a conventional combination of two autonomous languages: theoretical and observational.

d. Basic research operations include explanation and prediction by appealing to strictly universal claims; prediction is closely associated with hypothesis testing. Induction has no role to play in science.

2. The thesis of the rationalizing character of research in the humanities.

3. The thesis of methodological structuralism.

2

We have already discussed thesis 1 in sufficient detail. We shall not return to it. Instead, let us say more about thesis 2.

Given thesis 1, thesis 2 asserts that explanation (and prediction) in the humanities is often based on the assumption of the rationality of the human acts that are to be explained (or predicted). This assumption functions in much the same manner as do the laws in natural science: it is a strictly universal statement that allows us to derive the *explanandum* from the so-called initial conditions; it says that human acts are determined by (a) the agent's order of values and (b) by the agent's knowledge about how these values can be fulfilled. In other words, according to thesis 2, people's acts and the products of those acts are explained in the humanities by appealing to the agent's goals and his or her knowledge of the situation. But we should not treat the assumption of rationality as a law of psychology in the positivistic sense; instead, we should understand it as an expression of a relatively far-reaching idealization. This is why thesis 2 is in direct opposition to positivistic psychologism and does not conflict with thesis 1. It would have come into such conflict if similar idealizations did not occur in natural science. But they do. In fact, almost every law of nature that one considers turns out to be an idealization in that its application requires scientists to introduce a variety of corrections — stemming from the character of local conditions — which make it possible to derive approximate predictions.

Of course, in practice, explanation in the humanities is enthymematic, but the same goes for explanation in natural sciences. One can see just how many enthymematic premises it really involves by comparing research in the humanities with the posits of decision theory, which is a theory of rational behavior. According to decision theory, an agent satisfying the conditions of rationality behaves in the following manner:

1. She is to perform one of the acts $A_1, \ldots, A_n$ (to be more precise, one of the acts of type $A_1, \ldots, A_n$); in light of the agent's knowledge, these acts are collectively exhaustive (the acts include the act of not performing any of the other acts).

2. Given the agent's knowledge, the states of affairs $s_1, \ldots, s_m$ need to be considered as relevant, in light of that knowledge, to the particular acts' outcomes; states $s_1, \ldots, s_m$ are collectively exhaustive and mutually exclusive.

3. The acts' outcomes, each of which can be expressed symbolically as o_{ij} (the outcome of the i-th act given the j-th state of affairs; $i = 1, \ldots, n$ and $j = 1, \ldots, m$), are ordered by a preference relation of type $\leqslant$.[2]

4. If all the conditions above have been met then one of the following three situations is the case: (a) the agent believes that only state of affairs $s_j$should be taken into consideration and so she is certain of attaining outcome o_{ij} if she carries out act A_i ($i = 1, \ldots, n$) — this is acting under certainty; (b) the agent assigns a particular degree of probability to every state of affairs s_j ($j = 1, \ldots, m$) and so she is only able to calculate the probability of the outcomes o_{ij} — this is acting under risk; (c) the agent cannot even assign probabilities to the relevant states of affairs — this is acting under uncertainty. Now, describing an act in terms of rationality depends on the conditions in which the agent makes the choice. For the sake of simplicity, we shall only consider acts performed under certainty and their corresponding type of rationality.[3] Thus, an agent satisfying conditions 1—3 (acting under certainty) behaves rationally if and only if she performs act A_i, leading (in light of the agent's knowledge) to outcome o_{ij}, which the agent most desires.

As we can see from the characterization above, in order to explain, in

[2]The preference ranking relation can be characterized in a variety of ways, depending on the construal of decision theory. For example, R.C. Jeffrey (1965) takes it to be defined over a so-called probability matrix, with propositions as its elements; the probability matrix is closed under negation, disjunction and conjunction; it contains propositions concerning acts, outcomes of acts and propositions relevant to choosing acts to be performed. We shall not analyze the difference between various construals because they are not relevant to our discussion.

[3]Though bear in mind that, by taking into account risk and uncertainty, one can raise a number of interesting problems concerning cultural acts, esp. creative activities.

light of the rationality assumption, why an agent performed act A_k, we have to know:

1. Acts $A_1, \ldots, A_n$ that the agent could have carried out.

2. State of affairs s_j the agent believed to obtain at the moment of their decision.

3. A preference ranking defined on act outcomes o_{ij}; from now on, we shall call these outcomes "values" and the preference ranking — "the order of values."

Of course, given s_j, we can specify the function assigning particular values to pairs $\langle A_1, s_j\rangle, \ldots, \langle A_n, s_j\rangle$. So, from the data given in 1—3, it follows, given the rationality assumption, that act A_k should be performed (o_{kj} must be the dominating value). In practice, explanation of an act in the humanities is usually restricted to providing the dominating value ("the goal," "the motive") and perhaps sketching s_j.

Now consider a relational system, or structure

$$S = \langle U; A, O, R, s_j\rangle,$$

where (1) the universe U is a set of states of affairs, describable in terms of the agent's knowledge, (2) A is a subset of U; its elements are acts $A_1, \ldots, A_n$, (3) O is a subset of U; its elements are values, (4) R is an order relation on values belonging to O, (5) $s_j$is the state of affairs relevant to performing the act and considered by the agent to obtain at the moment of the decision.

Structure S also determines: (1) the value dominating in the order of values — call it o_{kj}, (2) act A_k, which is characterized by the fact that it corresponds with o_{kj} (and the fact that the agent acts rationally). Let us call o_{kj} the meaning of act A_k and the whole structure S — the meaning structure of act A_k.

These terminological conventions allow us to say that to explain a rational act in the humanities is to assign to it an appropriate meaning structure. Henceforth, we shall call such explanations interpretations.

The universe U of the meaning structure consists of states of affairs. We use "states of affairs" rather than "propositions," as does R.C. Jeffrey, because this allows us not to go beyond extensional logic. It is also worth noting that we individuate states of affairs in terms of s-equivalence; namely, two states of affairs s_1 and s_2, corresponding to sentences S_1 and S_2 of

the agent's language, are *s*-equivalent if and only if sentences S_1 and S_2 are equivalent in light of the agent's knowledge, which is to say S_2 follows logically from the conjunction of $S_1$and a finite subset X of all sentences comprising the agent's knowledge such that X does not contain S_2, and vice versa — the conjunction of S_2 and X (without S_1) logically implies S_1 (S_1 occurs essentially in the first case whereas S_2 occurs essentially in the second). By analogy with *s*-equivalence, we can speak about the *s*-negation, *s*-conjunction, *s*-implication and *s*-disjunction of states of affairs.[4]

Let us now say a few words about thesis 3, the thesis of methodological structuralism. It asserts that knowledge about meaning structure is epistemically primitive with respect to knowledge about the rational act to be explained, or, in other words, that the interpretation of an act is more epistemically primitive than the act's description (or the description of the act's product). We cannot justifiably describe an act (or the product of an act) as a rational act of a given kind (as the product of a given kind of rational act) unless we have formed some kind of hypothesis concerning the act's (product's) meaning structure — in other words, unless we have some kind of interpretative hypothesis.[5]

We shall now use the notions we have introduced to define some further concepts.

First of all, let us specify the concept of a rational act of the n-th order.

Two rational acts A_i and A_j stand to one another in the relation of instrumental subordination (given the agent's knowledge and order of values) just in case the meaning of act A_i is a state of affairs s_i such that s_i is an *s*-conjunct of state s_j relevant to act A_j and the occurrence of s_i in s_j is a necessary condition for fulfilling the meaning of act A_j (of course, all these conditions are relative to the agent's knowledge and order of values).

In such a case, we shall also say that s_i is instrumentally linked with act A_j.

A rational act of the n-th order is a rational act A that can be characterized as a directed graph $G = \langle U; R\rangle$, where: (1) U is the set of rational acts comprising A, such that they are at most of the order of n—1

[4]In the semiotics of art, it may be more profitable to use the concept of a meaning isomorphism, carrying with it the requirement that the two sentences have the same structure and that their corresponding elements be synonymous; however, the weaker notion of *s*-equivalence is entirely sufficient for our purposes here.

[5]The thesis of methodological structuralism is incompatible with the methodological individualism advocated by the logical positivists and their chief opponent, K. R. Popper.

and one of them is of the order of n—1, (2) R is the relation of instrumental subordination whose field is identical with U, (3) directed graph G has a unique terminal vertex, (4) the meaning of the rational act being the terminal vertex of graph G is identical with the meaning of act A.

If the meaning of a rational act is to produce a particular object or the production of an object is instrumentally linked with that act, we call the object a product of that rational act. Just like acts, products have meaning structures associated with them; these are the same meaning structures as those associated with the rational acts leading to the making of the products. In particular, the meaning of a product is identical with the meaning of the act of making it.

We can now express the following conclusion: if the *explicans* of the term "sign," which we are going to construct in the first part of this paper, is to be a notion from the humanities then it should denote a class of rational acts and their products. In other words, we should construe signs as a certain kind of rational act or their products, in the sense of the terms "rational act" and "product" specified above.

3

A further approximation of the *explicans*' denotation follows from the intuitively obvious observation that not every rational act and not every product of a rational act is a sign. For instance, under normal circumstances, the making of a pair of shoes by a shoemaker, though, to an extent, a rational act (of a higher order), is not a sign. Incidentally, it is easy to see why this is so — namely, because, among other things, there is no act of interpretation, performed by some other individual, instrumentally linked with it. At any rate, the meaning of this act is not of the kind that requires that someone come up with its interpretation. Under normal circumstances, the shoemaker achieves his or her goal regardless of whether there exists an interpreter who can discover the meaning of the whole act along with its instrumental constituent parts (i.e., constituent rational acts).

Conversely, the rational act of tipping one's hat to greet someone will not fulfil the agent's goal if it is not accompanied by an act of interpretation performed by the addressee of the gesture (alternatively, by some bystanders witnessing it). We can even say more: for the meaning of the act to be realized at all, not only does the greeting's addressee (alternatively, some bystanders witnessing it) have to be aware of its meaning, but he or she (alternatively, some other witness) has to accept the gesture's meaning as well.

It may happen that one type of greeting gesture is not used in a given community, but if members of the community accept greetings as such and the gesture is interpreted as an instance of greeting then there is no reason why the gesture's meaning should not be realized.

An interpretative act accompanied by an acceptance of the meaning of the interpreted act (or the meaning of its product) — i.e., an interpretative act in which the interpreter and the interpreted share the order of values — will be called understanding.[6] It follows from the assumptions concerning rational acts, applied to the interpreter, that if person X understands a rational act of type A performed by person Y then X would also perform a rational act of type A if she had the same knowledge as Y (or, as they say, if X were in Y's shoes).

We shall call a rational act that is instrumentally linked with another agent's act of understanding a rational act directed toward understanding. It goes without saying that a sign is either a rational act directed toward understanding or a product of such an act.

Of course, the notion of a rational act directed toward understanding is, in a certain specific sense, a "subjective" notion. Understanding is instrumentally linked with a given act from the agent's point of view, relative to his or her knowledge. But it is easy to arrive at the conclusion that the agent's holding of such a subjective belief does not suffice for the act or its product to be a sign.

If someone makes an odd gesture and believes that it will be understood as a greeting, while in reality no one can ascribe any meaning to it, then the act in question is not a sign, not now at any rate.

4

Clearly then, not every act directed toward understanding and not every product of such an act is a sign. We must, therefore, restrict the denotation of the *explicans* of the term "sign."

Note in this connection that the rational acts and their products that we usually call signs (though probably other things as well) have a certain characteristic feature: such an act, or an object produced by it, is directly and spontaneously recognized as, respectively, a rational act or the product of a rational act. Typically, no one who lives in our culture has any doubt as to whether this or that kind gesture, made in such and such circumstances,

[6] We appeal here to certain intuitions present in the German philosophy of the humanities.

is a greeting. This is because, in every culture, there is a body of widespread knowledge that, under appropriate circumstances, enables its members to gain an immediate kind of understanding of certain rational acts and their products. We call this knowledge the rules of cultural interpretation. They ascribe meaning to rational acts and their products. More specifically, these rules define a given act A (or an object produced by it) as a rational act directed toward understanding (respectively, as the product of a rational act directed toward understanding), thereby assigning a meaning to act A (respectively, its product) and thus determining what kind of act or product it is.

These rules can be expressed in terms of sentences such as "Act A (performed in such and such a manner, in such and such circumstances) is a rational act with the meaning of type M." Similar rules can be formulated for products of rational acts.

For what follows, it is of utmost importance to distinguish between two kinds of acts and their products interpreted by the rules of cultural interpretation as rational acts or products of rational acts directed toward understanding. Namely, some of them only have what we call global meaning — which is the same for whole classes of rational acts (products) — whereas others have individual meaning, which is a specific variety of global meaning. Understanding global meaning is instrumentally linked with an act or product that has individual meaning.

The global meaning of a rational act (or product) directed toward understanding is the kind of meaning ascribed to it by the rules of cultural interpretation. This is why we can say that knowledge of the rules of cultural interpretation is both necessary and sufficient for interpreting (understanding) those acts and products that only have global meaning, whereas it is necessary but not sufficient for one to understand acts and products of the second kind.

If, to borrow and generalize Chomsky's terminology,[7] we define knowledge of the rules of cultural interpretation as cultural competence, we will now be in a position to state that, for example, possessing cultural competence is necessary and usually sufficient to interpret (understand) a greeting

[7]N. Chomsky talks about the „linguistic competence" of an "ideal speaker-hearer," clearly a special case of a rational agent. There is a contrast here between the conceptual apparatus of N. Chomsky's linguistics and the various theories employed within structural linguistics in that Chomsky's conceptual apparatus is typical of the humanities. Linguistic competence comprises syntactic, phonological and semantic rules of generative grammar (see Chomsky 1965, esp. pp. 3-4, 8-9, 47-53). It is obvious that the rules of generative grammar are a special case of the rules of cultural interpretation.

gesture, whereas it is necessary but insufficient to interpret (understand) most works of art. We shall come back to this problem in part II.

Global meaning defined by the rules of cultural interpretation can vary in generality. The most general meaning is assigned to acts and products by what we may call qualification rules; these are rules such as "This inscription is a sentence of the English language with such and such a grammatical structure," "This is an act of reciting such and such a poem," "This is an act of moving a chess pawn from *e2* to *e4*." The rest of the rules of cultural interpretation — the secondary rules of cultural interpretation — "refine" the picture provided by general meaning. They take the form of sentences such as: "This pawn move from *e2* to *e4* is a first move" or "This first chess move with the pawn from *e2* to *e4* opens the way for the bishop on *f1*."

The more secondary rules of cultural interpretation a cultural competence includes, the more refined meaning one can assign thanks to it to particular acts or products. Bear in mind, however, that even the most refined meaning is still a global meaning; many various acts can be chess moves, first chess moves and first chess moves opening the way for the bishop on *f1*, even if the classes in question are getting progressively smaller.

Let us call a system of rules of cultural interpretation containing the subsystem of qualification rules that ascribe the same global meaning to a particular class of acts (products) a cultural system.[8] The system of language acts (or, from the perspective of products, language), the system of a given type of ritual acts, the system of artworks, the system of literary works, the system of visual artworks, musical artworks, etc. are all examples of cultural systems.

Every rational act directed toward understanding governed by the rules of cultural interpretation will be called a cultural act and its product will be called a cultural object.

Note that these are restricted concepts of a cultural act and cultural object. For example, they do not, in the usual case, cover the modern activity of farming or its products. For, usually, the acts involved in modern-day farming are not directed toward understanding (at least not from the European point of view). It is possible to construct broader concepts of a cultural act and cultural object — ones that would cover farming and its products. Such concepts would surely mesh with common usage ("agriculture"). However, we are not interested here in such broader notions, so in what follows we use the terms "cultural act" and "cultural object" in

[8]This notion is characterized in more detail in Kmita, Nowak 1968.

the narrow sense specified above.

5

One question that still needs addressing is: Should we accept the following *explicans* of the term "sign:" "a cultural act or object," in the sense defined above, or should we impose on it some further restrictions?

The matter, it seems, is of a purely practical nature. Clearly, among the many uses of the word "sign," one can identify the — rather common — one according to which every act (product) open to interpretation or requiring understanding is called a sign. So, for instance, A. Brodzka writes in "Dyskusja o analizie strukturalnej" [The structural analysis debate]: "The scope of semiotic research is practically unlimited; every human activity signifies something and one can study it under the aspect of communication" (Brodzka 1967: 199).

Whether or not we use the word "sign" to refer to any cultural act or object, we must distinguish a subclass of those acts and objects such that the global meaning shared by all its elements consists in communicating states of affairs.[9] Now, it seems that the most appropriate and least misleading name for this subclass would be "sign," whereas we can refer to elements of its superset using the expressions "cultural act" and "cultural object." Our definitions of these concepts imply that every cultural act as well as every cultural object is amenable to interpretation (understanding), which appeals to the rules of cultural interpretation.

There is an account in Poland according to which all cultural acts, construed in a particular way, are signs and yet, construed in a different way, are not signs. Following L. Vygotsky, proponents of the account in question distinguish between the "psychological" and the "technical" functions of a cultural act ("cultural behavior"). Only some cultural acts, taken under the aspect of their technical function, are signs; these include, for example, most language acts. By contrast, taken under the aspect of their psychological function, all cultural acts are signs: "One and the same outfit is both a technical and a psychological tool. It can be explained in terms of the need it satisfies ('we wear woolen clothes in winter because it is cold outside and wool is a poor conductor of heat'), but it can also be understood as providing information about something other than clothes, something that

[9]The term "state of affairs" refers to "single" states of affairs (corresponding to simple sentences) as well as to whole structures constructed out of such "single" states of affairs by means of relations such as *s*-implication, *s*-conjunction, temporal succession, etc.

has nothing to do with the 'technical' function — the outfit communicates this information to anyone who looks at it and knows the right code. This information can be about the owner's financial status, his or her prestige, his or her generation, sex, the role he or she is playing (hunter, horseback rider, skier etc.), his or her good or bad intentions" (Brodzka 1967: 78).

According to this account, cultural acts are signs of objective social relations because the so-called syntagmatic and paradigmatic relations that hold between the signs are an "isomorphic" mapping of the system of social relations.

If we gloss over the objection that this account appeals to a virtually nonexistent systematic analysis of relations between the "signifiers," on the one hand, and between the "signified," on the other, and, above all, if we turn a blind eye to the fact that the isomorphism requirement is too strong,[10] it seems that this is a rather interesting — though apparently unintended — attempt at constructing a notion of sign that would be neutral as regards the methodological opposition between natural science and the humanities. That this notion is not purely humanistic is confirmed by the following two considerations: (a) the "signified" is "external" to the agent's knowledge; it is not a subjective (or, especially, intersubjective) picture of what, according to the agent's knowledge, is an "external" reality; (b) in contrast to the "technical" function, which seems to be subjective-teleological in character, the "psychological" function seems to be grounded in some relation of "unconscious expression" (which is also clear from the material we have quoted).

However, what we are interested in is a purely humanistic concept of sign. Of course, a garment can be a sign in the sense of the word we have adopted here, but on the condition that the subject's cultural competence is associated with a cultural system that assigns communicative meaning to clothes. The mere fact that, by looking at an outfit, one can infer (even in a systematized way) something about its wearer does not imply that clothes are a sign in the sense explicated here.

Before providing the final explication of the term "sign," let us discuss briefly an issue we have not dared to broach for fear of making our exposition too complicated. Namely, although we would like to use the term "sign" to refer to any cultural act or object whose cultural meaning is to communicate a particular state of affairs, it is clear that the word also applies to some elements of said acts and objects: these acts or objects do not communicate

[10]The isomorphism condition can be retained only if one adopts a very optimistic epistemology.

states of affairs on their own, but are such that replacing one of their elements with another (one that is, as a linguist would say, paradigmatically related to it) changes the meaning communicated by the whole act or object. In language, these elements include lexical morphemes, grammatical morphemes and phonemes.

This is why we distinguish between an autonomous sign and a distinctive element of an autonomous sign.

An autonomous sign, relative to cultural system S, is a cultural act or object whose global meaning within S is to communicate a state of affairs.

A sign, relative to cultural system S, is either an autonomous sign (relative to system S) or a distinctive element of an autonomous sign (relative to system S).

We believe that, given this explication of the concept of sign and some additional assumptions, one can revisit and, in some cases, formulate anew various problems from the general methodology of science, the methodology of the humanities, the methodology of studies into art, theory of culture, theory of language, etc. The fruitfulness of these applications would be the standard by which to judge the usefulness of the explication. Here, we restrict our attention to showing some applications of our concept to a single domain, namely the theory of art. To wit, we will assume that:

(A_1) Every artistic creation is a sign in the sense explicated above.

And then we will attempt to show that, given assumption (A_1), one can explicate two important concepts of the theory of art, namely those of symbol and allegory. The explications will be such that their semiotic *explicantia* will have sufficiently precise meaning and be in agreement with the most common linguistic intuitions associated with said concepts.[11]

II. Symbol and Allegory

1

We are now going to add three further assumptions to assumption (A_1). They are utterly uncontroversial. The second assumption simply reflects the obvious observation that artistic creations are autonomous signs composed of simpler autonomous signs. Parts of an artwork can communicate certain states of affairs outside of the context provided by the artwork itself (although, outside this context, the communicated meaning is usually

[11] Of course, the explication of the two concepts merely serves to illustrate how the proposed concept of sign can be used.

modified). Thus, in accordance with the terminology introduced in part I, we say that:

(A_2) Artistic creations are autonomous signs of a higher order.

The third assumption expresses the following. Consider a work of literature and an academic paper. The striking difference is that the latter communicates a complex state of affairs, a structure whose elements of the lowest order are assigned to the distinctive elements of the text, namely predicates, individual terms and logical constants (this assignment is accomplished by the reference relation); in contrast, the structure associated with the text of a work of literature — also expressed through the reference relation — is not identical with the state of affairs communicated by the work. The structure in question is the depicted reality. The depicted reality is somehow related to the state of affairs communicated by a literary work; we use the depicted reality to infer the state of affairs communicated by the work. So, we have here an additional, intermediary element which is not present in an academic paper. Even in the case of a newspaper report that is true to the "facts," when we treat it as a work of literature, we start treating the "facts" related in the article in the same way as we treat the depicted reality. This is why the newspaper report communicates to us more than an ordinary record of "the facts" — it communicates, for example, a certain generalized state of affairs.

It is worth emphasizing that the reference relation associated with an academic paper or a work of literature can be regarded as (more or less) well-defined only relative to a particular system of knowledge. The same goes for specifying the connection between the depicted reality and the state of affairs communicated by a work of literature.[12] This relativization is introduced as soon as we form an interpretative hypothesis as to the communicative meaning of the academic or literary work in question, i.e. a hypothesis identifying the state of affairs communicated by the work. It also follows from what we said earlier that the hypothesis involves assumptions concerning the author's knowledge of the world, since it is on the basis of that knowledge that the academic or literary work achieves its communicative goal. The author's knowledge includes: (1) a substantive component, which

[12]Strictly speaking, even relative to a given body of knowledge, the reference relation remains ambiguous (more precisely: there is more than one reference relation). This happens because the systems of knowledge that we have are incomplete, so every system of knowledge has a whole class of standard empirical models. More specifically, every sentence corresponds to a whole class of states of affairs. Here, for the sake of simplicity, we assume that every sentence corresponds to a single state of affairs.

goes beyond cultural competence and does not contain any rules of cultural interpretation; this component corresponds — via the reference relation — to those states of affairs that do not belong to the cultural system; and (2) a competence component, consisting of rules of cultural interpretation. In the cases under discussion, the competences are linguistic-academic and linguistic-literary in nature — they enable the author to communicate a state of affairs through a given medium.

The communicated state of affairs can just as well be stated by a sentence from the substantive component as by a sentence from the competence component of the agent's knowledge.

It follows from the above that a work of literature is a two-layered sign (an ordered pair of signs), as it communicates through the depicted reality as well as through the text. By contrast, an academic work is a one-layered sign.

Much the same thing can be said about fine arts, ballet, theater and opera. There may be some doubts concerning music, however. This would require a separate analysis; if its results were to be negative, the following assumption would have to be modified:

(A_3) Artistic creations are two-layered signs.

Note that, while many theorists and art critics would surely accept assumption (A_3), most of them do not distinguish the last two links, or ignore the intermediate element, in the following chain: painting (in Ingarden's sense) — depicted reality — communicated state of affairs. This phenomenon has found expression in the act of distinguishing, within the fine arts, works that are nonrepresentational. We shall discuss this unfounded distinction later and, in the process, shed more light on the justifiability of assumption (A_3).

Generally speaking, then, every work of art consists of: (1) a depicting structure (e.g., the text of a work of literature, a painting), (2) a depicted structure (e.g., the reality depicted in a work of literature), and (3) a communicated structure (the state of affairs communicated by the work).

As we remarked above, there are two kinds of structure communicated by an artistic creation: the structure can be asserted by a sentence from the substantive component of the author's knowledge or from the competence component. Aside from this, one can draw a further distinction between the communicated structures. There can be structures such that the fact of their communication is the global meaning of the work and structures such that the fact of their communication is an individual meaning of the work. In the first case, we interpret (and understand) an artistic creation

only by appealing to some widespread substantive knowledge and a certain common cultural (artistic) competence. In the second case, we also have to rely on additional interpretative hypotheses concerning the artist's individual substantive knowledge or her individual artistic competence. The expression "an individual artistic competence" need not be internally inconsistent; the act of individualizing interpretation, in so far as it is also an act of understanding, produces a new cultural system, represented — initially — by two people: the artist and the critic.

Indeed, by distinguishing artistic creations that possess individual communicative meaning, we make precise expressions such as "an evergreen," "a novel work," "a work of everlasting artistic value," "a work that has outgrown its epoch," etc. Thus, the assumption that

(A_4) Some artistic creations have individual communicative meaning

articulates more precisely these common intuitions.

2

Before we continue, let us summarize some of the conclusions we have reached so far.

From the viewpoint of the humanities, an artistic creation is a certain rational act of a higher order (theater, opera, ballet, performance of a musical composition) or the product of such a rational act (literary work, a piece of visual art). Like every rational act or product of a rational act, it is open to interpretation, which is a species of scientific explanation unique to the humanities. Because any artistic creation is a sign, its interpretation consists chiefly in identifying the works' communicative meaning, which is to say, in defining the structure communicated by the work. The structure may be a substantive state of affairs (sometimes an individually constituted one) or a class of artistic interpretation functions, corresponding to the rules of artistic interpretation (the class of "artistic conventions"). If an artistic creation is to realize its meaning, the work's meaning must be understood, or, in other words, the work has to be interpreted and the communicated structure accepted.

In keeping with methodological structuralism, an artistic creation constitutes itself at the moment of its interpretation; no uninterpreted act or object is an artistic creation and, furthermore, there can be no artistic creation without a cultural system whose rules of interpretation would classify the act or object as a work of art.

As a consequence, depicting structure S_1 and depicted structure S_2 constitute themselves relative to: substantive knowledge about the world

$k(W)$, artistic competence $k(C)$ and communicated structure S_3. If we designate the interpreter's knowledge of the corresponding factors (or their semantic correlates) as, respectively, $K(S_1; S_2)$ (the work of art is an ordered pair of signs, a two-layered sign), $K(W)$, $K(C)$ and $K(S_3)$, we can assert that, given our assumptions, the implication

$$K(W) \wedge K(C) \wedge K(S_3) \rightarrow \ K(S_1; S_2)$$

is a thesis of the interpreter's language, assuming the language contains the rationality assumption. In other words, given the assumption that the artist is rational, the consequent of the implication follows from its antecedent.

Of course, the rationality assumption, applied to the artist, is sometimes a severe idealization. It is therefore worth remarking that the interpretative hypothesis (the antecedent of the implication) can take the form of a historical hypothesis, which is satisfied to a better or worse approximation by the real artist, or of an ahistorical quasi-hypothesis, according to which the artist is a purely instrumental construct that allows one to assign to the work a largely arbitrary meaning structure. It is easily seen that historical hypotheses are used by researchers, whereas critics seem to favor ahistorical quasi-hypotheses.

It also follows from our assumptions that there is an assignment relation between S_1 and S_2, which, in the case of a work of literature, is based on the reference relation; we will later discuss the assignment relation associated with visual artworks. Here we shall define it as a first-order semantic assignment. We shall similarly define the relation between the text of an academic paper and the structure the text communicates. Of course, the relation between the depicting structure and the communicated structure is not a first-order semantic assignment, although the assignment has to obtain between the depicting structure and the depicted structure in order for the relation in question to obtain.

If we now abbreviate "$K(W) \wedge K(C)$" as $K_{W,C}$ we will be in a position to assert that the following is a thesis of the interpreter's language:

$$K_{W,C} \wedge K(S_3) \rightarrow \ (K(S_1) \rightarrow \ K(S_2)).$$

And if we also assume that the interpreter individuates depicting structure S_1 up to its semantic type, and we classify two depicting structures as being of the same type if they determine the same structure S_2 (given $K_{W,C}$ and $K(S_3)$), then we can transform our thesis into:

$$K_{W,C} \wedge K(S_3) \rightarrow \ (K(S_1) \equiv \ K(S_2)).$$

That is to say, in light of the interpreter's knowledge about the substantive and competence components of the author's knowledge and about the structure communicated by the work, a description of depicting structure S_1 (up to its semantic type) follows from a description of depicted structure S_2 (up to *s*-equivalences), and a description of depicted structure S_2 (up to *s*-equivalences) implies a description S_1 (up to its semantic type).

3

Before turning to the problem of the first-order semantic assignment in visual artworks, let us discuss briefly the character of this assignment in a work of literature.[13]

Every sentence of a literary text corresponds to what we call a semantic system. The system's elements include the denotations of the constants in the order of the constants' appearance in the sentence.

This is a characterization of semantic systems corresponding to simple sentences.

1. A simple sentence of the form "$Pa_1, \ldots , a_n$" is associated with a semantic system

   $$\langle \subset , \{\langle den(a_1), \ldots , den(a_n)\rangle\}, den(P)\rangle,$$

   where "$\subset$" stands for inclusion and "$\{\langle den(a_1), \ldots , den(a_n)\rangle\}$" represents a class whose only element is an n-tuple of the denotations of a_1, $\ldots , a_n$, whereas "$den(P)$" represents the denotation of predicate P.

   And so the semantic system that corresponds to the sentence "Warsaw is a city" is $\langle \subset , \{$Warsaw$\}$, class of cities$\rangle$ and the semantic system that corresponds to the sentence "Warsaw lies on the Vistula River" is $\langle \subset , \{\langle$Warsaw, the Vistula River$\rangle$, the relation of lying on$\rangle$.

2. A simple sentence of the form "Every P is Q" is associated with a semantic system

[13] This brief discussion is based on Kmita 1967. The notion of a state of affairs is slightly different here.

$$\langle \subset ,\ den(P),\ den(Q)\rangle.$$

For example, the semantic system corresponding to the sentence "Every raven is black" is

$$\langle \subset ,\ \text{the class of ravens, the class of black objects}\rangle.$$

3. A simple sentence of the form "Some P is Q" is associated with a semantic system

$$\langle \subset',\ den(P),\ den(Q)'\rangle,$$

where "$\subset'$" stands the complement of inclusion. For example, the semantic system corresponding to the sentence "Some ravens are black" is $\langle \subset',$ the class of ravens, the complement of the class of black objects$\rangle$.

The semantic systems we have considered above, corresponding to simple sentences, take one of two forms:

$$\text{I } \langle \subset ,\ K,\ L\rangle$$

$$\text{II } \langle \subset',\ K,\ L'\rangle.$$

A system of the form $\langle \subset ,\ K,\ L\rangle$ is a state of affairs if and only if $K \subset L$, and a system of the form $\langle \subset',\ K,\ L'\rangle$ is a state of affairs if and only if it is not the case that $K \subset L'$.

It is easy to see that, according to the characterization presented above, semantic systems are states of affairs only in those cases when the sentences that correspond to them by rules of denotation are, given the denotations established by those rules, true.

The system of denotation rules, which assigns denotations to the terms of the language, provides the language with a semantic model. Given a system of empirical knowledge K, we can specify what we call the standard empirical model (for simplicity's sake we assume that there is only one) of a given language with respect to knowledge K. The standard empirical model with respect to knowledge K satisfies the following conditions: (1) the only individuals that belong to the universe of discourse are physical objects, (2) individual terms refer to these objects in the standard manner, and (3) all the sentences comprising knowledge K are true in the model.

Scientific pronouncements, which always presuppose some knowledge K, are formulated in such a way as to come out true in light of knowledge K in the standard empirical model, or, in other words, to state states of affairs in the model. In other words, scientific pronouncements do not feature fictional sentences relative to given knowledge K.

Fictional sentences relative to knowledge K include: (1) contradictory sentences — which are false in every model of the language (in terms of which knowledge K is formulated), (2) non-contradictory sentences that are counter-empirical, or inconsistent with knowledge K, and (3) sentences that are consistent with knowledge K, but contain individual terms that do not refer to any physical objects. It is clear that the denotation rules assigning states of affairs that make up the depicted reality to sentences of a literary text must differ from the standard rules of denotation providing a language with a standard empirical model (with respect to knowledge K). Otherwise fictional sentences, typical of literary texts, would not be associated with any states of affairs, and, as a result, the depicted reality could not "constitute itself." Roughly speaking, the rules of denotation for expressions occurring in a literary text have to provide the language with a semantic model in which all the fictional sentences of the text come out true. Depending on the type of text, such a model is either a model of a modified language and modified knowledge K, or a model of an unmodified language and modified knowledge K, or a model produced by extending the standard empirical model (with respect to knowledge K) in such a way as to populate its universe by some fictional objects. The modification of language and knowledge makes them compatible with the truth of the fictional sentences occurring in the text. We will use the term "fictional states of affairs" to refer to states of affairs that correspond to fictional sentences in the appropriately constructed semantic models. The reality depicted in a literary work is a structure (a relational system) whose elements include particular (mostly fictional) states of affairs that stand for one another in particular relations (e.g., causal or temporal ones).

The structure communicated by the reality depicted in a work of literature — also a relational system with states of affairs as its elements — stands in the following relation to the depicted reality:

Every simple state of affairs in depicted structure (reality) $\langle \subset , K_1, L_1 \rangle$ or $\langle \subset ', K_1, L_1' \rangle$ is associated with a single state of affairs in communicated structure $\langle \subset , K_2, L_2 \rangle$ or $\langle \subset ', K_2, L_2' \rangle$ and the structures involved satisfy the following two conditions: $K_1 \subset K_2$ and $L_1 \subset L_2$, where state of affairs $\langle \subset , K_1, L_1 \rangle$ can correspond to state of affairs $\langle \subset ', K_2, L_2' \rangle$

only if K_1 is a singleton.

For example, depicted state of affairs $\langle \subset$, {Zagloba}, the class of defenders of Zbarazh$\rangle$ (more informally speaking, that Zagloba was one of the defenders of Zbarazh) corresponds to the communicated state of affairs $\langle \subset '$, the class of Wisniowiecki's soldiers, the complement of the class of the defenders of Zbarazh$\rangle$ (that some of Wisniowiecki's soldiers defended Zbarazh). We see that the following conditions are met: {Zagloba} $\subset$ the class of Wisniowiecki's soldiers and the class of the defenders of Zbarazh $\subset$ the class of the defenders of Zbarahz. In such cases, we shall say that the depicted state of affairs is included in the communicated state of affairs.

Naturally, the relevant inclusions are relative to an appropriately constructed model, not to the standard empirical model (with respect to knowledge K). Otherwise the inclusions of the kind {Zagloba} $\subset$ the class of the defenders of Zbarazh would be guaranteed trivially by the emptiness of the class {Zagloba}. By contrast, states of affairs comprising the communicated structure cannot be fictional: they have to be describable in terms of non-fictional sentences (relative to knowledge K).

This is what the relation between particular depicted states of affairs and the corresponding communicated states of affairs looks like. But, apart from this, generally: if the depicted structure is a relational system $\langle U; R_1, \ldots, R_n\rangle$ (R_i can be a one-place relation, or a class) and the communicated structure is a system $\langle U'; R'_1, \ldots, R'_n\rangle$ then $U \subset U'$, $R_i \subset R'_i$ ($i = 1, \ldots, n$). These inclusions also obtain in the appropriately constructed model of specially modified knowledge K, not in the standard empirical model (relative to empirical knowledge).

4

We have attempted to show the character of first- and second-order semantic assignments in works of literature, using the example of simple sentences and their corresponding states of affairs. The problem of the semantic assignment applied to the visual arts is much more complicated because, among other things, it has never received systematic treatment.

Let us begin by considering a concrete example: a description of the structure depicted in the painting *Winter* (also known as *Hunters in the Snow*) by P. Breughel the Elder. This is how an art historian writes about it: "We are looking from a hill at a vast valley covered in snow. The ponds are frozen over. Above the horizon, on the left — the sea. In the back, on the right, loom hills crowned with rocky crags. The air is crisp and clear. In the foreground, three hunters descend, followed by a pack of dogs, from the

snowy slope into the valley. Against the light background of the snow, the hunters cut sharp dark figures; the decorative silhouettes of the dogs stand out. The hunters' path is punctuated by black vertical accents of leafless trees whose dry twigs form fine arabesque patterns against the sky. The valley bustles with life: there are skaters on the frozen ponds and black human figures on the roads and around the houses. Far in the background, is a town on the sea. In the foreground, a tavern the hunters and their dogs are passing by. There is a bonfire in front of the houses; people are stewing something over the fire and a child is warming himself by it. Ravens are sitting in the trees. A black bird is gliding toward the valley, clearly visible against the grey shapes of the distant mountains" (Białostocki 1966: 389).

As we see, this is a description of the reality depicted by the painting (the depicted structure) that ignores the depicting structure ("the painting"), although the author of the description seems to suggest something else. As evidence one can cite the fact that the description begins with the phrase "We are looking . . . at a vast valley . . .;" after all, one can look, in the strict sense of the word, only at a "painting," or — the depicting structure.

Now consider the following two systems: $S_1 = \langle \subset , \{\langle$this ellipsoid splash of black paint, this oblong and branching splash of black and white paint$\rangle\}$, the relation of being on$\}$ and $S_2 = \langle \subset , \{\langle$this figure of a black raven, this outline of a branch$\rangle\}$, the relation of being over$\rangle$. System S_1 is an element of the depicting structure of the painting *Winter*, whereas system S_2 is an element of the painting's depicted structure. S_2 is a semantic system corresponding to the simple sentence "This silhouette of a black raven is located over the outline of a branch." It is clear that the relation between the two systems is based on the relation of analogy.

Since the concept of an analogy is far from clear, let us first provide one of its possible explications.

It is usually said than an analogy is a relation obtaining between individual objects, between properties, or between relations. The relation is characterized in such a way as to warrant an explication according to which there is an analogy between two relations R_1 and R_2 just as in the case where there exists relation R_3 such that both R_1 and R_2 are included in R_3. In particular, relation R_3 can be a so-called "formal relation" (Bocheński 1962).

Because the concept of analogy relevant to our purposes is the one obtaining between two structures, it is necessary to generalize the concept of analogy explicated above in order for it to also cover relational systems (structures). We shall say that two relational systems $S_1 = \langle U^1; R^1{}_1, \ldots$

, $R^1{}_n\rangle$ and $S_2 = \langle U^2; R^2{}_1, \ldots, R^2{}_n\rangle$ are analogical, relative to a *tertium comparationis* in the form of system $S_3 = \langle U^3; R^3{}_1, \ldots, R^3{}_n\rangle$, if and only if $U^1 \subset U^3$ and $U^2 \subset U^3$, $R^1{}_1 \subset R^3{}_1$ and $R^2{}_1 \subset R^3{}_1$, and . . . and $R^1{}_n \subset R^3{}_n$ and $R^2{}_n \subset R^3{}_n$ (Bocheński 1962: 113).[14]

As we can see, an analogy between systems S_1 and S_2 implies the existence of system S_3 such that $S_1 \subset S_3$ and $S_2 \subset S_3$ (in the sense of inclusion of structures specified above). The notion of analogy established by the proposed explication is relative to a third system, which we call *tertium comparationis*.

Returning to the example under analysis, we can now assert that between structures $S_1 = \langle \subset , \{\langle$this ellipsoid splash of black paint, this oblong and branching splash of black and white paint$\rangle\}$, the relation of being on$\}$ and $S_2 = \langle \subset , \{\langle$this figure of a black raven, this outline of a branch$\rangle\}$, the relation of being over$\rangle$, where S_1 and S_2 are, respectively, fragments of the depicting structure and the depicted structure of the painting *Winter*, there is an analogy relative to the following *tertium comparationis*: $S_3 = \langle \subset', $ the class of ordered pairs of black raven figures and outlines of branches, the relation of being over$\rangle$.

The analogy we are considering is of a special kind. Before we charaterize it more closely, let us distinguish in a general manner several basic kinds of analogy. First of all, we must distinguish between a formal and a substantive analogy. A formal analogy obtains between two systems if they are isomorphic. By contrast, when two systems are analogical, whether or not they are also isomorphic, there is a substantive analogy between them. As we see, the two kinds of analogy are not mutually exclusive: two systems can be both formally and substantively analogical. Note also that a formal analogy is a special case of analogy in the sense specified above. For let $\{S_1, S_2, \ldots\}$ be a class of isomorphic relational systems — we can construct a relational system that is the union of systems $S_1, S_2, \ldots$ (we add up the universes and the other corresponding elements listed in our characterization), which — as it is easy to see — is a *tertium comparationis* for any two isomorphic systems S_i, S_j $(i, j = 1, 2, \ldots)$; system S — to generalize J. Bocheński's terminology — can be called a "formal system."

It is understandable that a substantive analogy is much more important than a formal one when works of visual art are concerned. This is why

[14]The concept of analogy characterized above can be regarded as a generalized one, because it refers to two relations (which can be treated as a special case of relational systems), two properties (one-place relations), as well as n-tuples of individual objects (n-place relations).

we will not discuss the latter any more.

From a different point of view, one can contrast a visual analogy with an abstract one. A visual analogy (in light of knowledge K) obtains between the depicting and depicted structures in a work of visual art when the corresponding *tertium comparationis* is describable[15] in terms of sentences containing only observational terms (in light of knowledge K). It follows from this that every visual analogy is also a substantive analogy, which does not preclude the existence of a formal analogy as well. It is easy to recognize that the analogy we have been considering in connection with the painting *Winter* is a visual analogy.[16]

We can draw a further distinction concerning visual analogies to mark whether or not the depicted structure is describable in terms of non-fictional sentences. In the former case, we have an observational analogy, in the latter — a quasi-observational analogy. The character of the depicted structure is the only difference between an observational analogy and a quasi-observational one. The depicting structure is always observational in character.

Now the problem of how it is possible for a fictional depicted structure (relative to $K_{W,C}$) to be non-trivially included in a non-fictional structure of the *tertium comparationis* is solved in a manner similar to that concerning works of literature: the fictional depicted structure is describable in terms of a fragment of $K_{W,C}$ — a fragment in light of which the structure is not fictional. It is there that the relation of inclusion obtains.

A detailed discussion of this problem, as well as the general problem of semantic assignment (of the first and second orders) in works of visual art, would require a separate study and, especially, a more thorough formal characterization of all three structures involved.

Our analysis of depicted structure descriptions offered by art historians leads to the conclusion that an analogy assigning depicted structure to depicting structure is always as exact as possible. The structure serving as the *tertium comparationis* for such an analogy does not contain another structure that could play the part of a different *tertium comparationis*. So, if

[15]We use the concept of description as superior with respect to the concept of stating (the denotation of "description" is a superset of the denotation of "statement"): if a sentence describing a state of affairs is non-fictional then that state of affairs is also stated by the sentence.

[16]Note that the *tertium comparationis* with respect to which an analogy obtains can be nomothetic or idiographic in character. For example, a structure of the type $\langle \subset , K, L\rangle$ or $\langle \subset ', K, L'\rangle$ is idiographic when class K is spatio-temporally "closed," otherwise it is nomothetic. This distinction is relevant to a precise formulation of differences between realism and naturalism.

we assert that a fragment of the depicting structure represents a raven on a branch then we will not agree that it represents just any bird, any creature, or any physical object, although — obviously — whenever there is an analogy between the given fragment of the structure depicting a raven, the analogy also obtains between the fragment of the structure and an arbitrary bird, creature, object.

Moreover, the way in which the "content" of a work of visual art (communicated state of affairs) is usually characterized clearly indicates that the *tertium comparationis* with respect to which there is a maximum analogy between depicting and depicted structures is in most cases identifiable with the structure communicated by the artwork. And since, as we have assumed, the depicted structure is constituted by an interpretation that assigns to it communicative meaning, it follows from the above that, in most cases, the principle of maximum analogy allows us to assign communicative meaning to the work and the depicted structure to the depicting structure. The principle of maximum analogy usually obtains even when the connection between depicting structure and depicted structure is based on an abstract analogy.

The case of the *tertium comparationis'* of a maximum analogy being different from the work's communicated structure will be discussed later. We can now assert, at any rate, that second-order semantic assignment, or the assignment of depicted structure to depicting structure, in a work of visual art is much the same as in the case of works of literature (at least when the *tertium comparationis* is identical with communicated structure): namely, the depicted structure is included in the communicated structure. The chief difference is that, whereas in the case of a work of visual art the analogy underlying first-order semantic assignment serves also as the basis for second-order semantic assignment, in the case of a work of literature first-order semantic assignment is grounded in the reference relation.[17]

Of course, the principle of maximum analogy cannot guarantee that the first-order semantic assignment in works of visual arts be unambiguous (in practice, more or less approximately unambiguous); artistic competence needs to be involved as well. What is more however — it seems to be an obvious fact for every sociologist of culture that the spectator would not even be able to recognize the analogy between depicting and depicted structures without having some artistic competence (K_C); usually substantive knowledge alone (K_W) does not suffice. This is especially true of works of

[17]Which is in no conflict with the fact that in the case of literary works the analogy between depicting structure (the text) and depicted structure also plays an important part; the suggestion seem especially true about works of poetry.

art involving an element of "deformation."

5

We should emphasize that it is no accident that art historians do not use notions related to abstract analogy, and especially theoretical analogy, which we will discuss presently. So far, art history has not produced any theories, in the strictest sense of the word; instead of theories, there are various intuitive and metaphorical suggestions. The same goes for many more methodologically mature fields of study; most theories in such fields are far from complete and large parts of every theory are reconstructed only hypothetically. This lack of serious methodological reflection in the theory of art has led theorists of art to ignore the distinction between the observational and the theoretical, so when discussing the notion of analogy, they only see the more "palpable" observational analogy and do not consider analogies based on theoretical knowledge, or, more generally, on abstract knowledge.

We characterize the notion of abstract analogy as follows: in light of knowledge K, there is an abstract analogy between structures S_1 and S_2, relative to the *tertium comparationis* S_3, if S_2 in not describable in the language of knowledge K solely in terms of observational sentences (relative to K).

It follows from this characterization that specific simple sentences that state particular states of affairs comprising S_3or asserting the existence of specific relations between those states of affairs have to feature some theoretical (unobservational) terms.

Just like in the case of visual analogy we can appeal here to the fictional vs. non-fictional character of structure S_2, and thereby distinguish between theoretical and quasi-theoretical analogies.

Abstract analogies play the same part with respect to first- and second-order semantic assignment as do visual analogies. As an illustration, let us use the well-known painting by Malevich entitled *Black Square*.

Let S_1 be the following fragment of the depicting structure: $\langle \subset$, {⟨this square surface of black paint, this square surface of white paint⟩}, the relation of being on⟩. The corresponding fragment of depicted structure S_2 can be established as follows: $\langle \subset$, {⟨this black surface, this white surface⟩}, the relation of movability of planes} (the phrase "the relation of movability of planes" refers to the relation consisting in the distance between the two planes constantly changing). This choice of S_2 is justified by appeal to the following *tertium comparationis* S_3: $\langle \subset$, the relation between black surface

and white surface, the relation of being perceived as changing in relative distance⟩.

It should be added that we have only considered a fragment of the depicting structure of Malevich's painting, which is why we only identified a fragment of its depicted and communicated structures.

At first blush, it may seem that an abstract analogy occurs — as a basis for first- and second-order semantic assignment — only in so-called abstract art. In fact, however, this is not the case: abstract analogies have always played an important part in non-abstract art in general, a in traditional art in particular. Moreover, positive assessments of classic artworks formulated by art historians are usually motivated, more or less consciously, by an appreciation of factors constituting the depicted space and communicating particular spatio-temporal relations. These factors occur in the depicted structure because they have been assigned to elements of the depicting structure by abstract analogy.

Since abstract analogies co-establish first- and second-order semantic assignments in pieces of visual art, even artworks regarded as abstract in character (in which visual analogy is of little significance) have both depicted and communicated structure. Hence, describing these works as "non-representational" is misleading.

6

The remarks above, which give a sketchy characterization of first- and second-order semantic assignments in works of literature and visual art, have set the stage for the following question: Does the relation between the symbol and the meaning communicated by the symbol obtain in the framework of semantic assignment of the first or second order? Having subjected various pronouncements about symbols to a close examination, we believe that the word "symbol" has two essentially distinct meanings. In its first meaning, the relation between symbol and communicated meaning occurs in the context of semantic assignment of the first order, whereas in its second meaning — of the second order.

A classic example of the first way of construing the meaning of the word "symbol" is the one present in C. S. Peirce's theory of signs; he divides signs into: icons, indices and symbols. Icons stand for particular objects because of some shared properties — or, in other words, because there is an analogy between the iconic sign and the object it stands for. The analogy involved is almost always observational (though Peirce misleadingly

talks about analogy in general). Indices are symptoms of objects they represent. And symbols are "conventional" in character; they include linguistic expressions (onomatopoeias are both symbols and icons).

It is easy to see that symbols, in this sense, belong to the semantic assignment of the first order. Indeed, they are "conventional" in character, whereas symbols in the second sense belong to the semantic assignment of the second order and are not "conventional."

Because in what follows we will only be interested in the notion of symbol in its second sense — which is more frequently employed in research into art (though equally often conflated with the notion of symbol in the first sense) — let us quote some pronouncements that make use of this notion of symbol. Let us stress that it is closely associated with the notion of allegory, which is used in a much more uniform manner than the term "symbol," for it only appeals to second-order semantic assignment.

This is what we read about symbol and allegory in *Reallexicon zur Deutsche Kunstgeschichte*:

"An allegory is a representation in which a non-visual conceptual or mental content (e.g., justice) is represented by means of imagery. It is not easy to distinguish allegorical from symbolic representations. Nonetheless, the two should not be equated — even if they often are. We see symbolism in its purest form in cases where simple, usually object-like forms serve as substitutes for higher and more general contents because of some shared rationally intangible, essential qualities . . . The capacities of symbolic representations to express content are both different and incomparably more extensive than the expressive capacities of allegorical representation . . . Symbolic and allegorical representations merge together when, through the process of rationalizing its content, an initially symbolic image becomes open to didactic interpretation." Allegories are often described as ". . . fantastic representations that lay no claim to empirical probability . . . An allegory is naturally grounded in language; every noun carries a seed of personification; every metaphor suggests an image. The content of an allegory in fine art is usually derived from these and many other forms of linguistic expression . . ." (Held 1937: 317).

Note, above all, that the "allegorical representation" ("symbolic representation") described in the quotation can be understood either as a situation (a state of affairs) or as a thing (an object). For reasons that will soon become clear, we explicate this "representation" as a certain situation. Here are the most significant claims suggested by the quotation above; we express them in terms of the conceptual apparatus we introduced earlier:

A. Both an allegorical and a symbolic situation are represented states of

affairs (featuring in the depicted structure).

B. Both an allegorical and a symbolic situation are fantastic in character: the sentences that describe them are not only fictional, but also incompatible with the nomothetic component of contemporary knowledge (hence their lack of "empirical probability").

C. The predicates featuring in sentences describing an allegorical or symbolic situation are observational in character ("the conceptual content of an allegory is expressed by means of imagery").

Claims A — C list the shared properties of allegorical and symbolic situations, whereas the following theses contrast them:

a. The state of affairs communicated by an allegorical situation is uniquely assigned to it (an allegory expresses its "content" completely, there is no room for further interpretation); symbolic situations lack this property ("the capacities of symbolic representations to express content are incomparably more extensive").

b. The state of affairs communicated by an allegorical situation is discursive in character: it consists of denotations of particular expressions belonging to a given, commonly used language ("an allegory is naturally grounded in language"); symbolic situations lack this property.

c. A symbolic situation is transformed into an allegorical situation when people begin interpreting the situation by assigning to it a particular discursive state of affairs as the state of affairs communicate by the situation (the "content" of "an initially symbolic image" becomes "rationalized").

Claim A is self-evident, so we are going to cite several pronouncements alluding to claims B and C.

"The symbolized motif always appears in new associations: once in rational, once in irrational mental combinations; thus, in partly conscious and partly unconscious associations of ideas; in various individual experiential combinations, which constantly confer different meaning to identical objective sensations" (Hauser 1958: 49) ". . . the external, visible part of a symbol must be a concrete image of the world experienced through the senses, so that it will have a clear and ordinary meaning even for those who are not going to seek in it any profound significance . . . behind this concrete image

lie vast horizons of the hidden, eternal, immutable and inconceivable essence of things" (Przesmycki 1894: lxviii).

The last two quotes emphasize the property of a symbolic situation which is often somewhat misleadingly called its "double layeredness," "indirectness." The elements of a symbolic situation — the properties and relations — are recognized by the interpreter whether or not she is aware of the symbolic meaning of the situation; establishing this meaning involves an additional hypothesis that further structuralizes these recognized elements. This "indirectness" of a symbolic situation is secured by claims B and C: recognition of particular elements of a symbolic situation involves observational knowledge (claim C), but the meaning communicated by the symbolic situation is not describable in terms of that knowledge because, as a whole, the situation is fantastic in character (it is incompatible with the nomothetic part of that knowledge — claim B).

The unambiguity of the meaning communicated by an allegorical situation and the ambiguity of the meaning communicated by a symbolic one are stressed by the following pronouncements: "To name an object is to take away three-fourths of the pleasure given by a poem. This pleasure consists in guessing little by little: to suggest it, that is the ideal" (Mallarmé 1956: 869). That is the ideal of S. Mallarmé, an eminent symbolist. Goethe writes in a similar vein, contrasting symbolism with allegory: "Symbolism transforms an object of perception into an idea, the idea into an image, and does it in such a way that the idea always remains infinitely operative and unattainable so that even if it is put into words in all languages, it still remains inexpressible" (Goethe 1998, 1112, 1113). E. von Sydov (1928: 28) and A. Hauser (1958: 47) write about the "ambiguity" of symbols and their "variable interpretability." S. Skwarczyńska also stresses this difference between a symbolic and an allegorical situation: "We talk about allegory when the represented object evokes a superstructure with a uniquely defined content."

The represented object ". . . has to have such a form as to irresistibly evoke that and only that interpretation" (Skwarczyńska 1954: 306). The authors of *Zarys teorii literatury* [An Outline of Literary Theory], M. Głowiński, A. Okopień-Sławińska and J. Sławiński write: An allegory occurs "when some linguistic sign or some object is always substituted for some concept . . . nothing of that sort happens when a symbol is involved; a symbol directs us toward the represented object, or suggests it, but never completely replaces it" (Głowiński, Okopień-Sławińska, Sławiński 1962: 117).[18]

[18]Note, by the way, that by including "linguistic expressions," the authors do not

It is easy to see that almost all the authors we have quoted associate thesis a (about the "unambiguity" of allegorical situations and the "ambiguity" of symbolic situations) with thesis b (about the linguistic expressibility of the meaning communicated by the former and the linguistic inexpressibility of the meaning communicated by the latter). Thesis c is rather historical in character, although the transformation it characterizes can always be explained in terms of theses a and b.

7

Claims A — C and theses a — c will serve as a criterion of adequacy for the explications of the terms "allegorical situation" and "symbolic situation." The explications should imply these claims and theses.

An allegorical situation, relative to $K_{W,C}$, is a depicted state of affairs that jointly satisfies the following three conditions: (1) the sentence described in terms of $K_{W,C}$ contains only observational predicates (relative to $K_{W,C}$), (2) the sentence is fantastic in character (inconsistent with the nomothetic component of K_W), (3) the meaning communicated by the situation has a global meaning, determined by a competence from K_C.

A symbolic situation differs from an allegorical situation only with respect to condition (3): the meaning communicated by the situation is individual in character — not determined by any competence from K_C.

It seems that it might be useful to define the following concept:

A symbol or allegory in the narrow sense — relative to $K_{W,C}$ — is any distinctive element of a symbolic or allegorical situation (relative to $K_{W,C}$) such that replacing it with a different, paradigmatically equivalent element (e.g., the property of being a lion with the property of being a kangaroo) causes the situation to lose its symbolic or allegorical character (relative to $K_{W,C}$).

A disjunction of the concept of a symbolic situation and the notion of symbol in the narrow sense is equivalent to the concept of a symbol in the wider sense. Likewise for an allegorical situation and allegory in the wider sense. Note that art theorists frequently conflate the elements of both series: symbolic situation, symbol in the narrow sense, symbol in the wider sense; allegorical situation, allegory in the narrow sense, allegory in the wider sense.

distinguish between the two kinds of semantic assignment we have identified. In consequence, every linguistic expression with an established meaning is allegorical in character.

It is obvious that the explications of "allegorical situation" and "symbolic situation" imply claims A — C, so let us examine briefly whether they also imply theses a and b.

The fact that an allegorical situation is associated with a uniquely defined communicative meaning (the state of affairs it communicates) is guaranteed by condition (3) of the explication; the rules of cultural interpretation included in competence C specify this meaning unambiguously and the assignment is uniform for all members of the community using the cultural system in question. At the same time, the non-uniqueness of the assignment of communicative meaning to a symbolic situation also follows from condition (3) of the (corresponding) explication: the communicative meaning can only be reconstructed in a hypothetical mode, by trying various interpretative hypotheses, which may in time form the basis for new rules of cultural interpretation (see thesis c).

Condition (3) of the explication of "allegorical situation" also implies that the state of affairs communicated by the situation is discursive in character (thesis b); this is because rules of cultural competence must appeal to a body of substantive knowledge (K_W) accepted at a given time, in terms of which the corresponding state of affairs can be stated. By analogy, the fact that the meaning communicated by a symbolic situation is not uniquely defined (the second part of thesis b) follows from condition (3) of the explication of "symbolic situation." According to this condition, the communicated meaning is individual in character, which is to say it is not covered by rules of cultural competence. One can only reconstruct it in hypothetical mode and the choice between various interpretative hypotheses is largely arbitrary: every hypothesis that explains the depicted structure (and organizes it) is acceptable.

The range of acceptable interpretations of a symbolic situation and the extent to which these interpretations are underdetermined are considerable, given that the fantastic character of the situation in question (condition (2) of the explication). Hence, the part of our nomothetic knowledge, concerning regularities in the domain of observable phenomena (condition (1) of the explication), that is compatible with the symbolic situation may not be sufficient for us to discover the symbolic situation's communicated meaning. Indeed, this is often the case. More often than not, the whole nomothetic knowledge that is not "cast into doubt" by the symbolic situation is also not enough. So, as a result, we are forced to reconstruct the meaning communicated by the symbolic situation by appealing to some new knowledge, which is sometimes incompatible with the received knowledge $K_{W,C}$. If this new

knowledge never gains currency (never becomes assimilated into a cultural system) then the meaning communicated by the symbolic situation will never be fixed; the symbolic situation will never be transformed into an allegorical one. This is Goethe's ideal and, above all, Mallarmé's.

From among many consequences of the proposed explications, relative to the assumptions we have adopted, let us select one more.

Since the depicted structure constitutes itself only at the moment of defining the artwork's communicative meaning, it follows that the same goes for symbolic and allegorical situations. The structure of an allegory is given immediately, as it were, owing to the rules of cultural competence (this is why the fantastic character of an allegory never causes the interpreter any problems and why many authors stress its "conventional" character, so that its interpretation does not involve substantive knowledge), by contrast, a symbolic structure has "a Janus face:" it is as indeterminate and changeable as the hypotheses we appeal to when interpreting it. Note further that, in the case of visual artworks, both situations are only partially structured — given their fantastic character — by appeal to visual analogy; this analogy allows us to recognize certain distinctive elements of a situation, but does not provide us with the structure of the situation as a whole (be it allegorical or symbolic in character). It follows from this that the meaning communicated by the situation, allowing us to discover the structure of the situation, is different here from the analogy's *tertium comparationis*. The fact that when interpreting an allegorical or symbolic situation we largely abstract away from its depicting structure, whose role is essentially restricted to determining particular elements of the depicted structure (by appeal to the *tertium comparationis*), explains why many theorists disapprove of (broadly construed) "symbolism" in the visual arts. The artist creating such works does not compel the spectator to enrich his or her artistic competence as far as "pure painting" is concerned.

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Leszek Nowak

SOME REMARKS ON THE CLARITY REQUIREMENT AND THE CONCEPT OF LINGUISTIC ANALYSIS

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Clarity is probably the most basic requirement laid down by logic in its broadest sense. As far as I know, however, the concept has not received any in-depth analysis, although the requirement has been repeated on various occasions. Such an analysis is not the purpose of these remarks either: their goal will be achieved if the concept of clarity and the associated notion of linguistic analysis become at least slightly clearer than they are now.

I should add that in this article I will only be concerned with the issue of clarity of declarative statements, i.e. sentences, without touching on the problem of clarity of other utterances — normative, evaluative, or interrogative. As for the concept and various types of linguistic analysis, illustrative examples will be drawn from works in the field of logical semiotics, where various kinds of analysis occur in the most lucid way.

Varieties of the clarity requirement

It seems quite natural to treat the clarity requirement as a directive of rational linguistic behaviour. Accordingly, formulating clear (comprehensible, informative) utterances would be a condition for rational linguistic behaviour. Such a description, however, is too vague, since in order to determine whether a given action is rational, it is necessary to set a goal (a value) to be achieved by this action (Simon 1957: 242). In a given situation, performing an action with respect to one goal may be rational, while carrying out the same action

in the same circumstances but with respect to a different goal might be irrational.

It seems that the goal of all actually formulated declarative statements is to inform someone about something — whether it is someone specific, anyone, or the speaker herself. In some cases, the aim of the communication may be the ultimate goal, the goal pursued by the author of the statement, but it may also be instrumental in relation to some other purpose. In the latter case the author might want the statement to have a cognitive value. Since the cognitive value is only assigned to assertions which can be socially controlled, it is necessary that a statement aspiring to cognitive value should be communicable. In a special case, this cognitive value of a claim can rest on the fact that it is a theorem of science, so that the problem to which this claim responds is regarded — within a given paradigm of science — as a scientific issue.

Since clarity of a statement is necessary for achieving the communicative and thereby the cognitive goal, and in the special case — a scientific one, the following rules can be considered directives of rational linguistic behaviour:

(1) to inform someone about something, one should make statements which are clear to this person;

(2) to formulate a statement with a cognitive value, one should express it clearly;

(3) to formulate a statement which is a scientific theorem, one should express it clearly.

The idea expressed in requirement (1) is simple: a person who has a communicative intention, wants the hearer to experience a particular belief; if the speaker formulates an unclear statement, she will make the realization of this intention difficult or impossible. It is evident, therefore, that uttering unclear statements cannot be regarded as a rational behaviour if the aim of the speaker is to inform the addressee about something by means of those utterances.

Given that the communicative goal of an utterance is, as we have said, instrumentally subordinated to the cognitive aim, the above justification of requirement (1) can be repeated with respect to requirement (2). The requirement of clarity in the latter version has been assumed e.g. by Jan Łukasiewicz who judged unclear sentences to be cognitively worthless. He demanded that all philosophical problems which cannot be given a clear resolution should

be rejected as metaphysical (Łukasiewicz 1928). By contrast, issues taken up by philosophers which can be formulated clearly, comprehensibly (and which include — according to Łukasiewicz — problems of determinism, causation, and teleology) can be considered as having a cognitive value; they can even be granted the status of scientific problems — they will be solved once the solutions have been proved in specially constructed axiomatic systems (Łukasiewicz 1970).

A less radical position concerning the status of unclear utterances was taken by Kazimierz Twardowski. His position roughly amounts to requirement (3). Twardowski observed that some philosophical problems are formulated so vaguely that it is virtually impossible to set them out in a lucid way. Even so, it does not follow that these problems, as well as the doctrines which provide solutions to them, lack cognitive value. Still, those obscurely formulated questions and philosophical claims do not belong to the set of scientific questions and assertions — they have a cognitive value but lie outside the field of science. Perhaps in the course of further development of knowledge it will become possible to determine the point of those claims or even to solve them (Łuszczewska-Romahnowa 1968: 160).

Thus the difference between Twardowski's and Łukasiewicz's positions could be summarized in the following way: for the former, statements which cannot be formulated clearly do not belong to science — they do not deserve to be called scientific; for the latter, not only do they fall short of being scientific, but they also lack any cognitive value. It is clear then that Twardowski accepted version (3) of the clarity requirement , while Łukasiewicz assumed version (2).

The concept of clarity and obscurity of statements

On the face of it, the concept of clarity is a psychological notion. I will try to show, however, that such an account leads to consequences that are incompatible with the intuitions we have when we say that certain statements are clear or unclear.

Let us try to explicate the psychological notion of clarity. To this end, it is necessary to make use of a psychologically understood concept of informing. Namely, we will say that an utterance U *informs* a person Y at a moment t that p if and only if (1) Y thought at t that p and (2) the fact that Y receives U is a necessary component of a sufficient condition[1] for the fact

[1]If A_1 and A_2, and ..., and A_{k-1}, and A_k, and A_{k+1}, and ..., and A_n constitute a sufficient condition of B, then A_k is a *necessary component of a sufficient condition*

that Y thought at t that p. Accordingly, the definition of the concept of clarity runs as follows: a sentence S formulated by a person X is CLEAR to a person Y at t if and only if X formulated S in order for the hearer (either a concrete one, e.g. Y, or an arbitrary one) to think that p, and if the sentence S actually informs Y at t that p.

It seems that this definition is prone to a variety of objections. First, the concept of clarity is usually understood in such a way that it is possible to attribute clarity (or the lack thereof) to statements contained in a text written by many authors who need not share one communicative intent (e.g. members of opposite parliamentary factions intentionally propose to formulate a document — to be enacted by the whole parliament — in such a way that important divergences are hidden behind generalities). Yet the above definition fails to encompass such cases. This suggests that common intuitions concerning the concept of clarity do not involve communicative intents of the author of a statement which is deemed lucid or unclear. Second, the definition is open to doubt even if we limit it to statements of a single author who is actually experiencing a communicative intention. The reason is that in numerous situations we are unable to determine the author's real intention. Yet, despite these often unsurmountable difficulties with figuring out other people's intentions, we usually feel free to regard a given statement as clear or unclear. It is possible because the assessment of clarity depends not on the author's intention but on whether we consider a given statement as comprehensible to competent users of the language in which the statement was formulated. It is quite another thing whether the utterance is adequate with respect to the communicative intents of its author. Third, it might happen that a person who thinks that p utters an extremely obscure statement which is impossible to understand even for a charitable and competent interpreter, yet the hearer has thought that p due to utterly accidental associations. The statement could hardly be considered clear — a verdict which is at odds with the definition in question.

The drawbacks listed above stem from the fact that the definition is based on the concept of communicative purpose and on the psychologically understood notion of informing. As a result, whether an utterance turns out to be clear for someone depends on a variety of incidental — from a linguistic point of view — properties of the hearer (receiver), such as intelligence, ability to focus, memory, etc. The same statement will be perfectly clear to

for B if and only if A_1 and A_2, and ..., and A_{k-1}, and A_{k+1}, and ..., and A_n are not a sufficient condition of B.This description takes its cue from the definition given by Kotarbiński (1965: 15).

a more intelligent person and obscure to a less intelligent one. Yet we would like to understand the concept of clarity in such a way that statements of the same form and with the same meaning are either both lucid or both obscure.

The above difficulties can be solved by introducing the concept of a rational linguistic subject who is supposed to be a 'perfect logician', that is, someone who is able to apply all logical rules of inference, who accepts all logical tautologies, rejects all counter-tautologies, and in addition, is a perfectly competent speaker of a given language, i.e. can apply all rules of this language. In constructing such an ideal type of linguistic subject, we can use the concept of grasping a linguistic utterance which is independent from accidental circumstances of an extralinguistic nature. It is so, because the concept of the hearer has been 'normalized', unified.

In order to explicate the concept of clarity it will be necessary to clarify yet another term, namely: "the sentence (...) says that: (— — —)". The ordinary sense of this term seems to require that "(...)" should be substituted with names of declarative sentences and "(— — —)" — with names of propositions. For instance, in the expression "The sentence őIt snowsŕ says that it snows" the written mark "It snows" put in internal quotation marks is a name of a declarative statement (sentence), while the written mark following the expression "says" is a name of a proposition. The proposition can be described as a type (set) of synonymous sentences (Church 1956: 4f). So the sentence S says that p insofar as p is a type (set) of sentences synonymous with S. Such a description implies that if a sentence S_1 says that p, while S_2 says that q, where S_2 is a nonequivalent consequence of S_1, then it is not the case that S_1 says that q.

We are now in a position to accept the following definition:

A sentence S of a language L is CLEAR with respect to L and a system of knowledge K if and only if a rational subject of L, acquainted with K, is able to indicate propositions p_1, p_2, ..., p_k ($k \geqslant 1$) such that she will accept that S says that p_1 or that S says that p_2, or ..., or that S says that p_k.

A sentence S of a language L is OBSCURE with respect to L and a system of knowledge K if and only if a rational subject of L, acquainted with K, is unable to indicate any set of propositions p_1, p_2, ..., p_k such that she would accept that: S says that p_1 or that S says that p_2, or ..., or that S says that p_k ($k \geqslant 1$).

Such a description entails that a rational linguistic subject is not capable of determining what an obscure statement says in a given language. It does not mean, however, that such a subject is unable to specify what the vague

statement is about, i.e. which objects it describes. Of course, even this might be impossible in extreme cases of obscurity.

The pair of concepts "obscure statement — clear statement" can be contrasted with another opposition — "univocal statement — ambiguous statement." A statement is univocal if a rational linguistic subject will insist that it expresses exactly one proposition, and it is ambiguous if the subject can decide that the statement expresses multiple alternative propositions. Plainly, a lucid statement can be both univocal and ambiguous, insofar as the propositions involved are clearly stated.

Legitimacy of the clarity requirement

Let us consider whether the requirements listed above are plausible. The legitimacy of requirement (1) is uncontroversial — it is obvious that formulating clear statements facilitates achieving the communicative goal. It is also worth noting that requirement (1) is by no means synonymous with the simplicity requirement: *speak in such a way that every person with some minimum knowledge* (e.g. a secondary-school knowledge[2]) *could understand you*. For if we were to take the simplicity requirement literally, and without qualifications as to the scope of its application, we would be forced to refrain from mathematical discussions in professional circles as incomprehensible for laymen... By contrast, requirement (1) is relativized to a circle of addressees the speaker wishes to inform. So if the speaker wants to inform an undergraduate, then — in accordance with requirement (1) — she should formulate her statements in such a way that they are clear based on the knowledge covered by the secondary-school curriculum. Yet if she is going to inform a highly skilled specialist, she need not assume any restrictions as to the technical terms she employs, the knowledge of the addressee, etc.

Requirement (2) is fundamentally wrong insofar as the term "cognitive value" is taken in its usual sense according to which heuristic means, leading to proper discoveries, also have a cognitive value. Historians of science often emphasize that:

> "things are more or less discovered, not discovered outright from complete obscurity to complete revelation. One step consists in acquiring the idea of a principle; another, if not several others, in giving a precise form to that idea and driving it far enough

[2]Such a requirement was put forward by Twardowski (Kotarbiński 1959: 3).

> to be able to make it a starting point for further researches." (Hadamard 1954: 145)

It would be a huge simplification to deny any value to ideas which gave rise to important scientific discoveries only because those ideas were stated in an insufficiently lucid way. Thus it seems wrong to regard claims of traditional philosophy as cognitively worthless (pointless) only because they are unclear. A different perspective on a given issue, explicating it by means of a new conceptual apparatus, might bring out important and interesting themes. In general, the following principle seems plausible: "if a given statement appears to be unclear, assume that it is clear while it is you who failed to understand it properly; only after numerous genuine attempts at understanding have failed, should you assume that it is unclear." Admittedly, the principle takes away the satisfaction usually derived from ridiculing incomprehensible ideas, but in return it offers a chance that one will not overlook important, albeit vaguely stated, views.

As for requirement (3), it is worth noting that it may be treated as a quasi-definition of the concept of science and thereby as an expression of terminological decision according to which the label "scientific" can be attributed to a claim only if it has been stated clearly. In fact, science is understood nowadays as a system of intersubjectively expressible claims, that is to say, roughly, statements which are clear in the sense assumed in this article.

On the concept of linguistic analysis

By "analysis of a linguistic expression" one usually understands the process of clarifying the meaning of this expression, resulting in a claim that the expression in question means such and such thing. Yet the goal of linguistic analysis is not only to provide a semantic equivalent of the *analysandum*, but also to provide an equivalent that would require no further analysis, that is — a *clear* one. An operation which consists in providing a synonymous expression regarded by the analyzing person as unclear could hardly be counted as analysis. That being said, the analyzing person can be mistaken and provide an *analysans* which seems clear to her but which is actually obscure.

Since the aim of an analysis of an expression is to define the sense of this expression, the analyzing person assumes a fixed language — let us call it the language of analysis — in which she is supposed to render the *analysandum*. She will consider her analysis adequate not when she believes

that she understands the expression but only after she is able to translate the analyzed expression into the language of analysis. For instance, for some logicians, the only clear theorems are those which can be translated into the language of mathematical logic, set theory, or a discipline of comparable degrees of precision; any claim which fails to be expressible in such languages is discarded as 'muddle-headedness', 'metaphysics', etc.

The above remarks prompt the following definition of the concept of linguistic analysis: a person X carries out an ANALYSIS of an expression A of a language L in a language L' and with respect to knowledge K if and only if (1) X claims that the meaning of an expression A' (of L') in L' is the same as the meaning of an expression A in L, and (2) X claims that the expression A' is clear in L' with respect to K.

If by adequacy of an analysis we understand the truth of a claim which is the result of the analysis, we can say that an analysis is adequate when the analyzing person proposes as an *analysans* an expression which has the same meaning as the *analysandum* and which is clear with respect to the assumed knowledge.[3]

Descriptive and reconstructive analysis

We can distinguish several types of linguistic analyses depending on which kind of language of analysis has been employed. The criterion distinguishing various types of analysis from this perspective consists in the restrictions imposed on the language in which the analysis is performed. Roughly speaking, in the field of logical semiotics — where various sorts of analysis occur most clearly — three types of analysis are used:

I. An ordinary language is used as the language of analysis.

II. An artificial but not formalized language is used as the language of analysis.

III. A formalized language is used as the language of analysis.

[3] A certain remark leaps to mind concerning the so called paradox of analysis: "If the verbal expression representing the *analysandum* has the same meaning as the expression representing the *analysans*, the analysis states a bare identity and is trivial; but if the two verbal expressions do not have the same meaning, the analysis is incorrect" (Langford 1942: 323). Namely, given the concept of analysis proposed in my paper, it is true that an analysis is inadequate if there is no synonymy between *analysandum* and *analysans*. It is not true, however, that an analysis is automatically correct (and thereby trivial) if the synonymy holds: in addition, the *analysans* must be clear.

By invoking the terminology introduced by Janina Kotarbińska (1964: 22), the analysis of type I can be called descriptive and the two remaining ones — reconstructive, while type II is explicative and type III — formal.[4]

An instructive example of descriptive analysis has been given by Maria Ossowska (1932) who analyzes the concept of expressing. The analysis consists in a meticulous differentiation between semantic varieties of the term "expressing." The author distinguishes four main meanings of the phrase "A sentence S expresses a thought T" which can be found in natural language. For instance, let us show how she analyzes the first version of this phrase, according to which expressing consists in representing thoughts: a thought should be connected with the relevant statement by some similarity. The author distinguishes three criteria that can applied in order to determine whether such a similarity occurs or not. Thus she considers the structural similarity of written marks or sounds constituting the sentence to psychological representations of those marks or sounds; she also discusses a material criterion: identity of the content of the sentence and the content of thought; finally, she analyzes a mixed criterion which requires that the two previous conditions are met. If we accepted the first criterion, we should admit that the sentence "Socrates and Alcibiades had a picnic on the bank" would express both the thought that they had a picnic on the river bank, and the thought that they had a picnic on the roof of a certain building. Ossowska raises similar objections against the second criterion and concludes that the common intuitions are best preserved by the third, mixed criterion.

Note that the sense of the term "expressing" is clarified by means of terms drawn from ordinary language. The only condition, if any, is that they should be as unambiguous as possible. The language of descriptive analysis is the ordinary language; its choice can be justified in various ways: by appealing to practical reasons — that it is the most universally known, most communicative language, etc. — or to epistemological reasons.

Descriptive analysis can be contrasted with reconstructive analysis. The person who performs an analysis of this type imposes certain restrictions on the language she is using. If she is going to analyze a term, she assumes a set of terms in the language of analysis which are not interdefinable and uses them to explicate the term in question. If she intends to analyze the sense of a claim, she tries to construct, in the language of analysis, a sentence which is a translation of this claim. In any case, what is important is that not all clarifications of the analyzed expression will be regarded as

[4]This threefold division is inspired by the typology put forward by Witold Marciszewski (1962: 266f).

equally good. A satisfactory clarification must be formulated by means of the expressions assumed as basic or initial. Thus, from the point of view of the reconstructive analysis, it is unacceptable to use whichever ordinary-language term happens to be useful at any given moment of the explication. Such an implausible procedure is common in the works of philosophers representing the so called linguistic philosophy. For instance, R. M. Hare (1952: 118f), in analyzing the concept of good, points to the difference between the intrinsic and instrumental goodness, distinguishes descriptive components of the sense of the phrase "*a* is good," and finally arrives at the conclusion that various uses of the word "good" share the element of *commending* and the whole normative, nondescriptive sense of the word "good" boils down to this concept. Yet the notion of commending itself has not been subject to semantic analysis — it was just taken from the ordinary language.

The reconstructive analysis can be performed in a more or less formal manner; it can be carried out in a more formalized language by constructing it from scratch, or by using some already existing formal language; the analysis can also be more 'relaxed', providing a translation of the analyzed expression into an artificial language which is more precise and orderly than the ordinary language but still falls short of being a formalized language.

Let us begin with this 'explicative' type of analysis. A good example are the works of Kazimierz Ajdukiewicz in the field of epistemology. For instance Ajdukiewicz (1978b) analyzes the thesis of objective idealism in Rickert's formulation: "a statement is true if and only if it is dictated by transcendental norms." The analyzed language — according to Ajdukiewicz — is the language of Rickert's ontology and the language of analysis is the language of semantics. As a translation of Rickert's claim, Ajdukiewicz formulates the following equivalence: "in the language of natural science a statement is true if and only if it is dictated by the rules of direct consequence specific to that language, i.e. if it is a theorem of that language" (Ajdukiewicz 1978b: 150). Since the language of semantics used by Ajdukiewicz is not a formalized language, the analysis of Rickert's thesis cannot be regarded as a formal analysis. It is, however, an explicative analysis: although the language of analysis is not a natural language it is still an artificial, albeit not formalized, language.

As an example of formal analysis consider the analysis of pragmatic notions carried out by R. M. Martin (1959: 14f). The author constructs a language of pragmatics as a formalized language by defining in it ordinary pragmatic terms: assertion, utterance, subjective intension, etc. Martin begins by specifying the object language — the simplified theory of types *T*.

Then he constructs a semantic metalanguage of the theory of types, SM^T, which — apart from the syntactic metalanguage for T and the translation of T — contains semantic claims stating that a given metalinguistic expression signifies the corresponding expression from T. Next, on top of the semantic metalanguage, Martin builds a pragmatic metalanguage PM^T which contains — apart from terms and formulas from SM^T — new kinds of expressions: temporal variables and variables running over the set of men. In addition, in PM^T there is also a new primitive term: "X accepts a at time t," axiomatically characterized. Based on these preliminary assumptions, Martin defines several other pragmatic notions — subjective intension, understanding, uttering, etc.

It seems that each of the types of linguistic analysis described above has its advantages and disadvantages. The undeniable benefit of descriptive analysis is that a person employing this kind of analysis is free to deal with new problems that can be expressed in ordinary language but may be inexpressible in a more precise, albeit poorer, language. Still, the way of solving or even formulating the problems may be unsatisfactory. In order for those problems to be formulated and solved in a precise way, we must use a conceptual apparatus associated with some artificial language, either formalized or not.

The three ways of carrying out linguistic analysis need not be mutually exclusive. In fact, there is a good deal to indicate that they can, and should, complement each other. Namely, many semiotic problems can only be formulated — at first — in a sufficiently rich, albeit not very precise, ordinary language. More precise languages available at a given time might be too poor to express those problems adequately. This allows room for reconstructive analysis. Since it is rarely the case that imprecise intuitions are immediately expressible in formalized languages, the first step of their clarification is the explicative analysis. It is only at the subsequent stage of semiotic research that systems of axiomatic semiotics are constructed.

Accordingly, the view that reconstructive analysis fails to contribute anything relevant in comparison with descriptive analysis is equally implausible as the view that all cognitively valuable problems can be solved in the framework of artificial languages.

Historical and systematic analysis

Before we move on to further issues connected with the concept of linguistic analysis, a few words should be said about the assumption of

rationality of the author of an analyzed text, which is made in the course of analysis.

The point is that in analyzing any statements we adopt several assumptions concerning the author of those statements. We assume, for instance, that she does not accept two contradictory sentences at the same time; that if she accepts a sentence, then she accepts its logical consequences; that she accepts logical tautologies, etc. Hence, we tacitly presuppose a theory of rational linguistic behaviour (in the case of linguistic analysis of a text composed of declarative sentence — a theory of rational acceptance), and in the course of the analysis we put forward a hypothesis that the author of the analyzed text is rational, i.e. she satisfies the requirements of that theory of rational linguistic behaviour. Since theories of rational linguistic behaviour are special kinds of model theories, the rationality assumption plays a role analogous to the assumption about the applicability of a model physical theory (Nowak 1970).

We will now distinguish two types of linguistic analysis which assume the rationality assumption, but in each case the assumption is treated by the analyzing person in a completely different way. On the one hand, we are talking about historical analysis which is performed by someone whose purpose is to establish the author's intention in formulating such and such statements, in other words, someone who puts forward a hypothesis that by formulating the analyzed statement the author had in mind the content of the *analysans*. On the other hand, historical analysis should be distinguished from systematic analysis whose goal is not to determine the author's intention but to find out whether her statements can be understood in such a way that they serve as answers to questions posed by the analyzing person.

An example of systematic analysis is given by Ajdukiewicz's (1978a) analysis of the associationist theory of meaning. It is enough to juxtapose the associationist definitions of meaning with the ones given by Ajdukiewicz, which were supposed to be explications of the associationist theory of meaning, to realize that he neglected the historical aspect of the problem — whether Stanisław Szober, whose accounts are discussed in that paper, really envisaged the modifications of the associationist definition of meaning put forward by Ajdukiewicz. Ajdukiewicz introduces, for instance, a relativization to a language and to a capacity to use the language — in accordance with his own conviction that they are needed in defining semantic concepts. Thereby he adopts a number of assumptions forming the basis for those relativizations — according to Ajdukiewicz a person speaks in a given language if and only if she utters sounds envisaged by its syntax while being disposed to such

and such reactions in response to these sounds. Thus he assumes a theory of motivational connections, which are determined by the meaning rules (directives) of a given language and thereby he presupposes his directival theory of meaning. Naturally, it was not Ajdukiewicz's intention to attribute all of this to Szober or to any other associationist. He just wanted — on the basis of assumptions he himself considered relevant — to reconstruct the associationist theory of meaning so as to make it as interesting as possible from a purely theoretical point of view. In other words, he wished to make the most of its theoretical possibilities in order to figure out whether this theory, in its optimal form, contributes something important to the issue at hand — to the definition of meaning.

The difference between systematic and historical analysis can be clarified by appealing to the place of the rationality assumption in both analyses. Namely, the person carrying out the historical assumption treats the rationality assumption as a hypothesis, which — like any other hypothesis — must be tested and in the case of its refutation — rejected as a falsehood. By contrast, in the systematic analysis we treat the rationality assumption as a quasi-hypothetical assumption: there is no point in testing it, since it is not our task to determine whether the author is rational — we only want to establish what the author would claim if she were rational and if she endorsed our assumptions. It can be said, therefore, that the systematic analysis is based on counterfactual reasoning and the rationality assumption does not serve as an empirical hypothesis but as an *a priori* presumption which is left untested. The author of the analyzed text is treated not as a concrete person but as a purely instrumental construct; he is treated like the lawgiver by lawyers (Nowak 1968, chap. 8) or like the author of a literary work by a literary critic (Kmita, Nowak 1968, chap. 3). Systematic analysis involves "interpretations in which we set aside the actual mental state of the author of the text and we treat the text as an autonomous item with its own, objective significance" (Marciszewski 1968: 4).

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Leon Koj

THE BASICS OF DENOTATION

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INTRODUCTION

In one of my earlier articles (Koj 1966: 45—64) I presented a hypothesis[1] that systems of pure semantics constructed by logicians may be presented as theories explaining fragments of empirical pragmatics, i.e. pragmatics practiced by linguists, psychologists and sociologists. According to this hypothesis, terms of pure semantics can be defined in conditional definitions by using selected adequate pragmatic terms.[2] Regardless of these definitions, terms of pure semantics have additional characteristics in semantic axioms. The axioms of pure semantics and the conditional definitions should result in pragmatic theses regarding some of the phenomena discussed in pragmatics.

This hypothesis is tempting, but it must be verified. There is essentially only one way to do it. We have to present pragmatic theses and the system of pure semantics combined as described above: pragmatic theses result from the theses of pure semantics, and semantic terms are defined in the conditional definitions by using pragmatic terms.

The first difficulty encountered when trying to verify the proposed hypothesis is that essentially, there is no such thing as pragmatics being a set of related theses put forward in a relatively precise way (so that these theses could be linked with theses of pure semantics expressed using logical

[1] A simplified version of this hypothesis was presented in my article "Wspaniała samotność logiki" (Koj 1968).

[2] For more on the terms used, cf. "Dwie koncepcje semantyki" (Koj 1966) and *Introduction to semantics* (Carnap 1946: 9—11).

terminology) and sufficiently justified empirically.[3]

The first step towards verifying the hypothesis must be to adopt a relevant set of pragmatic theorems, and this will be the aim of the present article. I shall provide only a few pragmatic hypotheses, trying to give them such a form that allows them to be linked with theses of pure semantics. It is impossible to conduct an additional empirical proof of these pragmatic hypotheses here; I will leave this matter to competent scholars, in this case to psychologists. It is also impossible to fully specify all used pragmatic terms, because — as it is always the case with empirical sciences — defining is not separate from empirical studies. The studies conducted in the relevant fields of science so far are insufficient to provide definitions which would meet the requirements of logic.

Pragmatics is a very broad discipline which deals with various relations between man and sign. Therefore, it is advisable to first decide what kind of pragmatic relations would be taken into account to link pragmatics with pure semantics as easily as possible.

Without going into detail at this point, we could say that pure semantics deals with the most broadly understood relation of assigning words to fragments of reality. Let us call all these types of relations 'denotation'. It seems that if pure semantics deals with denotation, it would be best to take into account those pragmatic theses which speak about something very similar, namely about pragmatic denotation. The latter is a relation having at least one more domain than semantic denotation, the said domain being the set of people.

As I have already mentioned, the pragmatic theorems in question will have an empirical nature, which does not mean that they will have already been verified. Moreover, we can even expect that as the first attempts to specify certain regularities, they are likely to be much more simplified hypotheses and will require at least modification during empirical verification. The fact that the hypotheses are non-verified makes them highly uncertain, which is an obvious flaw. However, the normal course of events is to first formulate the hypothesis as precisely as possible before trying to verify it. Consequently, it does not seem necessary to refrain from presenting the hypotheses in question until they have been verified.

DENOTATION AND COMMUNICATION

[3]Recently, this fact was underlined by W. Mejbaum and R. Wójcicki in their article titled "Program metodologii pragmatycznej" (Mejbaum, Wójcicki 1967).

The basic pragmatic fact is human communication. If people refer expressions to certain fragments of the extralinguistic reality, they do primarily — if not exclusively — in order to be able to communicate with each other about these fragments of reality. In short, expressions denote in order to make the process of communication possible. The above statement is generally not challenged. Moreover, it should be observed that if expressions denote pragmatically, essentially for the sole purpose of allowing people to communicate, the characteristics of denotation are determined by the requirements of the communication process. Consequently, we can define the characteristics of denotation, taking into account the requirements of communication. In order to determine the most important characteristics of pragmatic denotation, first of all, we have to examine the necessary conditions of communication, as they contain what is most essential for this process and as they are also what determines the most important characteristics of denotation.

The process of communication is not equivalent to successful communication. Sometimes it results in understanding, and sometimes in lack of understanding or even misunderstanding. In this article, when discussing communication, we will focus only on such communication that meets all conditions leading to actual understanding, that is, fully correct communication. The reason for this restriction in the scope of our study is as follows. Pure semantics provides theorems concerning the semantic characteristics of languages, in which there is no place for imperfections such as ambiguity, vagueness, etc. Pure semantics deals with languages that are perfect in some respects. It is rather unlikely that pragmatic theorems describing unsuccessful communication, i.e. describing various deviations from the ideal correctness can be linked to pure semantics theorems. Those pragmatic theorems which describe the conditions of a fully correct process of communication have a much greater chance for it.

What are these necessary conditions for correct communication? First, we have to agree on some terminological issues.

For the purpose of the present discussion, a person expressing himself/herself orally or in writing, or in any other way, will be called the sender, while a person who is listening, reading or looking at gestures will be called the recipient. The user of a sign is either a sender or a recipient. The expression itself will be called a sign, while the object, feature or event which the user has in mind will be a denotatum. According to the above definitions, a sign may be a name (the denotatum being an object or a feature) or a sentence (the denotatum being an event). The term denotatum is thus taken in its broad meaning. At the same time, it is clear that the

concept of sign has been narrowed down to categorematic expressions. For our purposes, there is no need for a broader concept of sign. We should also add the common definition of communication; that is sending signs (together with expressions) in such a way that the recipient of these signs thinks the same about the same as the sender.[4] This general concept of communication is also a bit narrowed down. It takes into account only the fact that signs evoke thoughts, without considering beliefs, emotional states, etc.

In order to fully understand communication, we must first exactly define what we refer to as the concept of thinking about something. It is hard to say much about it in a definitive way. Instead, we can indicate several doubts that have not been solved so far. First of all, we do not know any methods which would allow us to establish, without doubt, what a given person is thinking at a given moment. We are able to establish it only partially and only with a limited dose of probability. Still, many statements about thinking have been made based on unreliable introspection. We will not, however, be dealing here with establishing what an examined person is thinking about at the given moment. These issues are important for verifying the hypotheses proposed here, but as we are leaving this verification to competent psychologists, they will remain beyond the subject of our discussion. What is important for this article is to define thinking about something from the formal point of view; that is as a relationship between man, denotatum and time, which is reflected in the following statement: at moment t person v thinks about denotatum y.

The above definition of communication, the terminological assumptions and every-day observations of the process of communication lead to some simple conclusions regarding the necessary conditions of communication:

(a) the sender uses a sign;

(b) the recipient perceives the sign;

(c) the sender and the recipient think the same about the same denotatum.

The above conditions (a) — (c) lead to even simpler necessary conditions. Since the person who produces the sign must perceive the sign when sending it (cf. Carrol 1964: 45—46, 77; Miller 1963: 172), namely to control the production of the sign, we can replace (a) with a more general condition:

(a') the user of the sign must perceive the sign.

Condition (b) is obviously covered by (a'), as the recipient of the sign is a user of the sign. The sender has already been discussed. If both users are to

[4]Among the many similar definitions of communication it suffices to have in mind those by F. de Saussure (de Saussure 1983).

think the same about the same thing, they definitely must think something about the denotatum, which gives us:

(b') the user of the sign must think something about the denotatum.

In order to clearly state that (a') and (b') are necessary conditions of communication, let us say it once again, formulating a relevant conditional phrase, in which (a') and (b') are elements of the consequent:

(1) If someone treats something as a sign of a certain denotatum (takes part in the process of communication), he must perceive this sign and must think something about the denotatum.

The necessary conditions (a') and (b') lead to equally obvious conclusions. In order for the process of communication to be effective, only those objects can be used as signs which can be constructed and perceived by the available means. Moreover, a denotatum can be only an object about which we are able to think something in the process of communication, in particular when perceiving the sign. This is a necessary condition of communication, which will be further discussed in sections 3—6.

THE TIME OF USING A SIGN AND THE TIME OF THINKING ABOUT THE DENOTATUM

One can clearly see the vagueness of condition (1). In particular, it is unclear whether the person taking part in the process of communication in a given moment must at the same time perceive the sign and think about the denotatum. It is not clear whether the effectiveness of communication depends on the time when the sign is perceived and when the users think about the denotatum.

There are several possibilities in this matter. Either an object is a sign at the moment in which it is perceived and in which one thinks about the denotatum, or an object is a sign when it is perceived, and the thinking comes later, or we first think and then perceive a sign. Let us consider the latter possibility. Thinking about the denotatum does not precede the perception of a sign by the recipient, as it is the perception of the sign that evokes the thought. It is also unlikely that a sender first thinks, then formulates a sign without thinking, and then suddenly perceives it. When sending a sign, the sender constantly controls its production, probably by comparing it with the thought which it is meant to express. In the event of any mistakes, he makes relevant corrections. This control requires thinking about the denotatum during sending, as it is rather not about thinking how the sign should look and then comparing the produced sign with the remembered design.

Due to the required control of the sign production, it is also rather unlikely that one first makes the sign and perceives it during this process, and only then thinks about the denotatum. For what would the sender be guided by when designing and producing the sign? The only possibility is thinking about the denotatum before or during the sending of the sign.

Naturally, it does not follow from the above that the sender cannot think about the denotatum when he is not sending the sign. The sender is perfectly capable of doing that. He can also perceive the sign while not thinking about the denotatum. In this latter situation, however, he perceives the sign as just a physical object or event which does not serve communication.

In the case of spoken signs, we are dealing with the need to follow the pace of the utterance. If the thought about the denotatum came after perceiving the sign, the reception of the next signs could be distorted. For while thinking about the denotata of previous signs, we would find it difficult to accurately perceive the later signs. This would lead to a backlog in thinking or perceiving. We observe this when we listen to a speech in a language in which we are not fluent. Memory is overloaded with images of signs, before we manage to think about their denotata. We tend to forget some of these signs or lose some elements of thoughts about their denotata. We commonly call it loosing the thread.

The situation is similar with the reception of written signs. Therefore, in order to effectively communicate (control the utterance and follow its thread) one should think about the denotatum at the moment when one perceives the sign.

Associationists have a different point of view. They believe that perceiving a sign is associated with the thought about the denotatum which comes a bit later (Szober 1924). This view has been criticised many times. I agree with the critical arguments and I shall briefly quote them with some additions.

Ajdukiewicz claimed that introspection does not let us identify the two different moments in which we perceive a sign and think about the denotatum (Ajdukiewicz 1960: 114). This argument, regardless of its value, is less useful here, where the point of discussion is whether the need for effective communication implies the need to think about the denotatum at the time when it is perceived.

As we know, one cannot produce as many simple and relatively short expressions as there exist objects, phenomena and events. In order to communicate all these matters, people had to invent languages which allowed them to use complex expression. According to Ajdukiewicz (1960: 114) and

Kotarbińska (1957: 62), associationism is not consistent with the commonly known fact that when encountering a new complex expression for the first time we are able to immediately understand it, as long as we know its components. There is no need to repeatedly associate a complex expression with the situation to which it refers to in order to understand it. Consequently, associationism cannot be reconciled with the observed facts resulting from the need to communicate.

Ossowska (1925: 258—272) points out that associating the perception of a sign with thinking about the denotatum does not guarantee explicitness of expressions, defined as linking an expression with the same thought in the sender's and recipient's minds. Thus understood, explicitness is an obvious condition for effective communication.

In reply to Ossowska's critical remarks, Szober (1925: 258—272) says that not all associations can determine the meaning of a word — only those that are established by usus. It seems that this reservation modifies Szober's original associationism and transforms it into a biological conception. For there is probably no other way to force the learners of a language to obey the so called usus than rewarding them for the correct usage of language (for correct reactions to language stimuli and apt linguistic reactions to non-linguistic stimuli) and penalising them for incorrect usage. The rewards and penalties may be simply effective and ineffective communication. Obtaining language skills by way of rewards and penalties is not simple association (based on existence in the same space and time, similarity and contrast), but rather referring to the mechanisms of a conditioned response discussed in biological conceptions (Kotarbińska 1957: 80).

In biological conceptions, a sign is a conditioned stimulus replacing an unconditioned stimulus. When the conditioning is strong enough, the reaction to the conditional stimulus is as quick as the unconditional one (Pawłow 1938). Thus, if we identify thinking about the denotatum with a cognitive response for an unconditional stimulus, then the conditional stimulus — in this case a sign — will evoke thoughts about the denotatum as quickly as the unconditional one. Becoming aware of an unconditional stimulus is at the same time a type of cognitive response to the stimulus. Therefore, becoming aware of a sign (conditional stimulus) is at the same time thinking about the denotatum. A similar opinion, namely that the time of perceiving a sign is identical with the time of thinking about the denotatum, in biological conceptions, can be found in Kotarbińska's work (Kotarbińska 1957: 82).

Closing the dispute with associationists, I would like to stress that this

is not about proving that we always perceive a sign when thinking about its denotatum. I am only proving the statement that in a fully effective process of communication, the time of perceiving a sign is identical with the time of thinking about its denotatum. But we can suppose that often communication is not fully effective, e.g. when one of the users does not know the language well. Probably the more effective a communication is, the more identical these times become — naturally, provided that other conditions of correct communication are met.

Intentional sign theories identify the time of perceiving a sign (when it is treated as a sign) with the time of thinking about the denotatum. This can clearly be observed in Ajdukiewicz's thought. He even identifies the thought about a sign with the thought about the denotatum, stating that the very thought that constitutes a use of the relevant expression as an expression of the Polish language consisted in thinking the thought that Charlemagne lived in the 9^{th} century (Ajdukiewicz 1960: 115).

In the context of the above, we can transform (1) into a more complete statement:

(2) If at a given time a person treats object x as a sign of denotatum y, then the person is perceiving the sign and at the same time is thinking something about y.

Theorem (2) is one of the premises for drawing conclusions on denotation. In order to facilitate the drawing of these conclusions from (2), we have to give it a different external form. Instead of the phrase 'at a given time a person treats object x as a sign of denotatum y,' we will from now on use the abbreviation '$Z(t, v, x, y)$', in which the variable t varies across a set of any time periods, variable v varies across a set of written signs or sounds, and y across a set of any objects, including written signs and sounds. This particular span of variables leads to conclusions of the same general nature as (1), at least as regards nominal signs.

The domain of y is not divisible into subsets of objects of various logical types. Due to the generality of the set covered by y we are dealing with only one type of nominal signs. If we divided y into several subsets differing in terms of logical type, we would have as many names from different syntactic categories as there are types making up the domain of y. Consequently, we would have to divide the denotation theorems of a sign into a relevant number of repetitions.

Due to the general nature of y, we cannot use any logical system using type theory as the basis for formalisation. Consequently, the basis for further discussion in this article will be the system of logic proposed

by Quine in his work *Mathematical Logic* (Quine 1951), which does not acknowledge types. This decision is also due to some more particular and technical premises, which are, however, irrelevant to this discussion.

Further simplifications of (2) are as follows. We replace 'the person is perceiving the sign' with '$D(t,\ v,\ x)$'. The phrase 'at the same time [the person] is thinking something about y' shall be extended to the following form: 'in moment t person v is thinking that ... y ...,' where any sentence (or sentential function) containing name y can appear after 'that'. In order to verbally express the fact that people also think about events, which are general sentences and which are described without the use of names, I shall generalise the above expression even further, to get: 'in moment t person v is thinking that...,' where the dots can be replaced with a declarative sentence (or sentential function) of any acceptable construction. An abbreviation of this type of expression will be '$M(t,\ v,\ \dots)$' or '$M(t,\ v,\ p)$', where p is a sentential variable.[5]

Theorem (2) is further shortened by introducing quantifiers in the place of words 'a [person]', 'at a given time', etc. Sentence conjunctions are replaced by logical sentential connectives. At the same time, these simplifications make the sense of (2) more precise, as the ambiguous conjunctions of natural language are given a more precise meaning by their counterparts in Quine's system.

If we additionally agree, in order to further facilitate this discussion, that when a person (v) thinks about an object (y), then v ascribes a characteristic (z), for instance, a relative characteristic to the object, i.e. classifies y to set z, and in the end (2) is replaced by:

$$(3)\ \mathrm{Z}(t,\ v,\ x,\ y) \rightarrow\ \mathrm{D}(t,\ v,\ x) \cdot \Sigma z M(t,\ v,\ y \in\ z)$$

NON-IDENTICALNESS OF PERCEIVING A SIGN AND THINKING ABOUT THE DENOTATUM

Identifying the time of perceiving a sign with the time of thinking about the denotatum leads Ajdukiewicz, in a way, to identifying the perception of a sign with the thought of the denotatum: "Let us consider the thought that constitutes the use of the expression "Charlemagne lived in the 9^{th} century"

[5]Providing an exact definition of the expression $M(t,\ v,\ p)$ would require defining the concepts of sentential variable and sentence, which entails the need to build a relevant fragment of syntax of the language that I am now informally characterising. I would rather not do this at this point, as I will be dealing with that in later parts of the work of which this article is part.

as an expression of the Polish language. On the one hand, this thought can be characterised as a thought which is the experience of a certain sensory content, and on the other hand, it can be characterised as thinking the thought that Charlemagne lived in the 9^{th} century" (Ajdukiewicz 1960: 115). This statement must be interpreted with great caution. The point is that the same thought can be expressed by using different expressions. This is necessary from the perspective of effective communication. When one expression is not understandable for the recipient, one has to introduce another expression representing the same thought. Furthermore, due to difficulties with understanding excessively long and complicated utterances, one has to use abbreviations. For example, it is unimaginable to have arithmetic useful in calculus, e.g. in school, which would be written entirely in primary symbols, solely using the false connective, a general quantifier and the symbol of set membership (primary signs in Quine's system). For the purpose of communication, one has to use synonymous expressions, i.e. expressions having different forms but evoking the same thoughts. As perception of different forms differs, we cannot assume that thinking about a denotatum is equivalent to perceiving a sign. If it was so, then while perceiving different signs of the same denotatum we would have to think something else about it each time. This, in turn, would exclude the existence of synonymous expressions. But this simple thought that the perception of a sign is not identical with thinking about the denotatum cannot be represented using simple equivalence:

$$(4)\ \mathrm{Z}(t,\ v,\ x,\ y) \rightarrow\ \sim [D(t,\ v,\ x) \equiv\ \Sigma z M(t,\ v,\ y \in\ z)]$$

As a sign is perceived simultaneously (as a sign) with thinking about the denotatum, (3) and (4) would immediately lead to a contradiction, assuming that signs exist. This fact highlights that (4) does not reflect the intentions in question. For (4) states that it is impossible to perceive a sign and think about its denotatum simultaneously. And the point is that they are different yet simultaneous events.

The core of the theorem which we want to adopt is the concept of different events. This concept is a negation of the concept of identicalness of events. It obviously differs from the known concept of identicalness of objects.

The concept of identicalness that is needed here does not have to be entirely general. It is enough for it to be relativised in terms of person and time. It is enough for it to state that two events are identical for someone

in moment t. It seems natural to describe this relativised identicalness of events in the following way: for person v, event p is identical in time t with event q, if thinking about p by person v in time t is equivalent to thinking about q by this person at the same time. If we mark the relativisation to time t and person v under the equal sign (at the same time stressing that we have in mind a relativised identicalness, referring solely to events), the definition will look as follows:

$$D_1 \quad p \underset{t,v}{=} q \equiv \ [M(t,\ v,\ p) \equiv \ M(t,\ v,\ q)]$$

Back to the main subject, I would like to remind the readers that we are trying to formulate the following statement: when x is the sign of y, then perceiving sign x is not identical, in terms of thinking, with thinking about denotatum y, i.e. the following theorem:

$$(5)\ Z(t,\ v,\ x,\ y) \rightarrow \ \sim [D(t,\ v,\ x) \underset{t_1,v}{=} \Sigma z M(t,\ v,\ y \in \ z)]$$

If perceiving a sign is not identical, in terms of thinking, with thinking about the denotatum, then neither is an entirely conscious perceiving of a sign. The latter perception may surely be identified with thinking about the denotatum. Thus, thinking about a sign is not identical, in terms of thinking, with thinking about the denotatum. This weaker version of (5) will be useful to us later. Let us assume that a fully conscious, and thus verbalised (at least in thoughts) perception of a sign, i.e. simply thinking about the sign, is not identical with thinking about the denotatum. This weakened (5) brings us even closer to the original theorem of Ajdukiewicz.

I will present the weakened version of (5) as follows:

$$(6)\ Z(t,\ v,\ x,\ y) \rightarrow \ \sim [\Sigma z' M(t,\ v,\ x \in z') \underset{t_1,v}{=} \Sigma z M(t,\ v,\ y \in \ z)]$$

Theorem (6) is also not the final form of the thesis on the difference between the conscious perception of a sign and thinking about the denotatum. What was said about a sign as a whole applies also to its parts and the verbal context in which it appears. Perceiving a part of a sign can also not be identical in terms of thinking with thinking about the denotatum. It also cannot be identical with a fragment of thought about the denotatum. If there was such identicalness, it would be impossible to exchange a part of a sign without changing the thought about the denotatum. Consequently, it would be impossible to replace an entire sign with a synonym, as the impossibility

of exchanging parts comes down to the impossibility of exchanging the whole composition of these parts.

The situation is similar with the verbal context of any sign x. The verbal context of x is also composed of signs, which can be replaced by synonyms without changing the thought about their denotata and the denotatum of x. Therefore, perceiving the verbal context of x cannot be identical with thinking about the denotatum of x.

A sign may be understood specifically as a given painting over a surface in space and time or as a given disturbance of air in space and time. A sign can also be understood in a more abstract way — as a class of specific inscriptions or sounds. Thinking about a denotatum cannot be identified with neither perceiving concrete signs, nor perceiving classes of signs. As a matter of fact, we do not perceive classes of signs, but rather their concrete examples. Anyway, in both cases, the result of this identification would be to eliminate synonymous expressions necessary in the process of effective communication.

Therefore, we have to additionally modify (6), making the reservation that thinking about parts of signs, their contexts, classes and elements, cannot be identified with thinking about the denotatum. This modification would give us the following result:

(7) $Z(t, v, x, y) \cdot (z\mathrm{C}x\ v\ xCz\ v\ z \in\ x\ v\ x \in\ z) \rightarrow\ \sim \Sigma z'z''[M(t, v, z \in\ z') \underset{t_1,v}{=} M(t, v, y \in\ z'')]$

(7) reads as follows: if in time t, for person v, x is a sign of object y and z is a part of x or x is a part of z, or z is an element of x, or x is an element of z, then thinking by person v in time t that z has a certain feature (thinking about z) is not identical, in terms of thinking, with thinking by person v in time t that y has feature z'' (thinking about y). Theorem (7) includes the concept of part C, defined by using the concatenation sign and concerning only the case when both the whole and the part are expressions.[6] If (7) included a general concept of part, it would be impossible to think about atoms and particles, as atoms and particles are parts of every sign. Defining the concept of part by using concatenation, we come to a very

[6]The definition of the said concept of part is as follows: $zCy = \Sigma z, u\ (y = x \bigwedge s\ v\ y = z \bigwedge x\ v\ y = z \bigwedge x \bigwedge u)$.

'$\bigwedge$' is a symbol of concatenation. Concatenation is a relation which appears exclusively between expressions, which is guaranteed by the following assumption: $x \bigwedge y = s' \rightarrow\ x, y, z$ are expressions.

narrow definition of part, which covers only inscriptions and phonemes.

DURATION OF THINKING ABOUT A DENOTATUM

When defining a sign, we agreed that it will cover only written or spoken expressions which we use in the process of communication. However, this limits our subject of discussion to signs in the actualist sense, excluding those in the potential sense. A sign in the potential sense is an object which can be used in the process of communication. A sign in the actualist sense is the one actually used for communication in a given moment. We have taken into account the more basic concept of sign, i.e. the actual sign. The concept of a potential sign is definable by a sign in the actualist sense in the so called conditional definition.

An object may be a sign in the potential sense for a very long time. The time when it becomes a sign in the actualist sense is much shorter. It is the time in which the user of the sign actually thinks about the denotatum and perceives the sign. This period does not cover any earlier or later fragment of time, in which the user would think about the denotatum or perceive the sign. It is, so to say, the shortest time, in which we are able to think about the denotatum. Thus, if in time t, for person v, expression x is the sign of object y, then if in this particular moment person v is thinking that y has feature z, there exists no such part of t in which person v would manage to think that y has feature z. We mark this finding in the following way:

(8) $Z(t, v, x, y) \rightarrow \{M(t, v, y \in z) \rightarrow \sim \Sigma t_1[t \neq t_1 \cdot t_1 P t \cdot M(t_1, v, y \in z)]\}$

P stands for 'is a part of'. Here, the concept of part is more general than before, when I used the symbol C. It is not defined using the concatenation sign. This concept will not appear further in this text, therefore I shall not describe it in detail.

LINEAR ORDER OF THINKING

Theorem (8) specifies which type of signs we are considering. It suggests further theorems. If x is a sign only in such short periods, it seems natural to adopt a hypothesis that in these short periods one thinks exclusively about the denotata of x, that there is no time left for thinking about anything else. This hypothesis has far-reaching consequences, thus it should be examined in detail. It says that it is impossible to think two different thoughts in the

short periods described by (8). Some psychologists and logicians seem to negate this. I shall name only three such authors: Łukasiewicz, Witwicki and Rubinsztejn. After a closer study of their views, it turns out, however, that it was only a seeming negation. Witwicki (1925, 282—284) and Rubinsztejn (1962, 597—598) say, in relation to the matter of the divisibility of attention, that there is a possibility of perceiving several things at a time. Here, however, it is about the possibility of having several thoughts at a time. There is, so far, no contradiction between the thesis on the divisibility of attention and our thesis. The arguments presented by Łukasiewicz also do not concern our hypothesis. Łukasiewicz (1910, 31—39) allowed for thinking two contradictory, and thus different statements. He even allowed for simultaneous believing in both of them. However, the time span in which this could take place was much longer than the one defined in (8). What Łukasiewicz had in mind was not the current thinking (in his terminology — belief), but rather the disposition to believe something. It would be fitting to agree with Łukasiewicz that we can believe contradictory statements: we first think about one, and then about another. The disposition to believe the first one while actually experiencing the other statement is maintained.

The thesis that it is impossible to think about several statements simultaneously can be backed up by one version of the thesis on the unity of speech and thought. The hypothesis on the full unity of speech and thought was explicitly proposed by Watson (1931, 225). He claimed that thinking consists in micro-movements of organs of speech. His thesis has never been commonly accepted. However, similar hypotheses are intensively tested through experimentation. For example, Sokołow (1966) found that there is a close link between the activity of the organs of speech and thinking. He established that when we are reading or solving a problem, that is when we are thinking, some electrical stimuli can be found in our organs of speech. Thus, the hypothesis on the connection between thinking and the stimulation of the organs of speech becomes very likely, at least when it comes to more specific thinking, expressible in words. It is possible that other, less specific types of thinking, are more loosely connected with stimulation of speech organs. For example, they can involve the stimulation of muscles responsible for movement or stimulation outside the brain which could be undetectable. Here, however, we are talking exclusively about thinking strictly related to using signs, i.e. discursive thinking. For this type of thinking, it seems justified to adopt the hypothesis on a close connection between speech and thinking, without stating anything about other types of thinking. In addition, I would like to point out that our hypothesis does not identify thinking with

the stimulation of speech organs.

It is obvious that we say one word after another. Speech has its linear order. Written signs are essentially ordered in the same way. We may assume that the stimulation of speech organs corresponding to verbalising words is ordered in the same way as the similar, though much stronger stimulation of these organs during normal speech. If the latter is linear, we can say the same about the corresponding stimulation during thinking. Consequently, we may suppose that thinking is also linear, i.e. that it is impossible to have several different verbalised thoughts at the same time during communication. Thus, if in time t for person v expression x is a sign of object y and in the same time t person v is thinking that y has feature z, and in time t_1 person v is thinking that object w has feature z', and in addition either $y \neq w$ or $z \neq z$', then $t_1 \neq t$. This gives us the following theorem:

(9) $Z(t, v, x, y) \rightarrow [(y \neq w \vee z \neq z', \{M(t, v, y \in z) \rightarrow \sim\Sigma t_1[t \neq t_1 \cdot t_1 P t \cdot M(t_1, v, y \in z)]\}$

The hypothesis that it is impossible to think two different statements at the same time can also take another, more elaborate form. Namely, instead of stating that one can think about two different objects or features in different periods of time, we can just say that statements thought simultaneously are identical in terms of thinking (we are naturally still talking about short periods described by (8)). A stronger hypothesis would be as follows: if in time t for person v object x is a sign of object y and person v is thinking in time t that y has feature z and in addition person v is thinking at the same time that object w has feature z', then both these thoughts are mentally identical. This supposition takes the following form:

(10) $Z(t, v, x, y) \rightarrow \{M(t, v, y \in z) \cdot M(t, v, w \in z') \rightarrow [M(t, v, y \in z)]\} \underset{t_1, v}{=} M(t, v, w \in z')]\}$

One of the forms of the hypothesis that it is impossible to think several statements simultaneously was adopted by Szober (1924: 2—3). It can also be derived from de Saussure's theorems on the linear ordering of language and on language as a psychical phenomenon.

CONSEQUENCES OF THE ABOVE THEOREMS

In the second paragraph, I said that a denotatum can be both an object and an event; a sign can thus be either a name or a sentence. In the third

paragraph, I defined y as a variable across a set of any classes. Consequently, at the beginning I restricted the concept of sign to names and I only stated the necessary conditions for using a nominal sign. The symbol representing the relation of using a nominal sign was the letter Z. This operation, narrowing down the scope of the concept of sign, was necessary, as there is no system containing logical constants and the set membership sign, in which there would be variables varying across a set composed of objects (classes) and events, i.e. there is no such system in which variables would be nominal and propositional at the same time (Koj 1963: 235). However, we can still achieve the initial generality by introducing theses analogous to (3), (7), (8), (9), and (10), concerning denotata that are events or states of affairs. In order to achieve this goal, I shall simply replace the nominal variable y in (3) and further theses with the entire propositional function. This way, I have a characteristic of the necessary conditions of correct usage of sentential signs, symbolised by Z_z. From now on, the use of nominal signs will be referred to as denotation in the narrow sense.

Here are the theses corresponding to (3), (7), (8), (9), and (10). I will not comment on them, as all comments to hypotheses (3), (7), (8), (9), and (10) apply to them as well.

(11) $Z_z\ (t,\ v,\ x,\ y \in\ z) \rightarrow\ D(t,\ v,\ x) \cdot M(t,\ v,\ y \in\ z)$

(12) $Z_z\ (t,\ v,\ x,\ y \in\ z) \cdot (wCx\ v\ xCw\ v\ w \in\ x\ v\ x \in\ w) \rightarrow\ \sim[M(t,\ v,\ w \in\ z') \underset{t_1,v}{=} M(t,\ v,\ y \in\ z)]$

(13) $Z_z\ (t,\ v,\ x,\ y \in\ z) \cdot M(t,\ v,\ y \in\ z) \rightarrow\ \sim\Sigma t_1[t \neq\ t_1 \cdot t_1 Pt \cdot M(t_1,\ v,\ y \in\ z)]$

(14) $Z_z\ (t,\ v,\ x,\ y \in\ z) \rightarrow\ [t = t_1 \cdot M(t,\ v,\ y \in\ z) \cdot M(t,\ v,\ w \in\ z') \rightarrow\ (y = w \cdot z = z')]$

(15) $Z_z\ (t,\ v,\ x,\ y \in\ z) \rightarrow\ [M(t,\ v,\ y \in\ z) \cdot M(t,\ v,\ w \in\ z') \rightarrow\ M(t,\ v,\ y \in\ z) \underset{t_1,v}{=} M(t,\ v,\ w \in\ z')]$

Theorems (3) and (7) — (15) have several consequences. I shall now discuss some of them. For example, they give us a version of the psychological law of noncontradiction concerning discursive thinking (in the following theses $\bar{z}$ is a complement of class z):

(16) $Z\ (t,\ v,\ x,\ y) \rightarrow\ \sim[M(t,\ v,\ y \in\ z) \cdot M(t,\ v,\ y \in\ \bar{z})]$

(17) $Z\ (t,\ v,\ x,\ y) \rightarrow\ \sim[M(t,\ v,\ y \in\ z) \cdot M(t,\ v,\ \bar{y}\ \in\ z)]$

(18) $Z_z\ (t,\ v,\ x,\ y \in\ z) \rightarrow\ \sim[M(t,\ v,\ y \in\ z) \cdot M(t,\ v,\ \bar{y} \in\ z)]$

(19) $Z_z\ (t,\ v,\ x,\ y \in\ z) \rightarrow\ \sim[M(t,\ v,\ y \in\ z) \cdot M(t,\ v,\ y \in\ \bar{z})]$

Theorems (16) — (19) are a direct consequence of the hypothesis on the linear character of discursive thinking.

It follows from (3) that:

(20) $Z\ (t,\ v,\ x,\ y) \rightarrow\ \Sigma z M(t,\ v,\ y \in\ z)$

It follows from (11) that:

(21) $Z_z\ (t,\ v,\ x,\ y \in\ z) \rightarrow\ M(t,\ v,\ y \in\ z)$

Theorems (20), (7) and (10) entail:

(22) $Z\ (t,\ v,\ x,\ y) \cdot (zCx\ v\ xCz\ v\ z \in\ x\ v\ x \in\ z) \rightarrow\ \sim \Sigma w M(t,\ v,\ z \in w)$

And from (21), (12) and (15) respectively we get:

(23) $Z_z\ (t,\ v,\ x,\ y \in\ z) \cdot (uCx\ v\ xCu\ v\ u \in\ x\ v\ x \in\ u) \rightarrow\ \sim \Sigma w M(t,\ v,\ u \in\ w)$

(24) $Z\ (t,\ v,\ x,\ y) \cdot (yCz\ v\ zCy\ v\ y \in\ z\ v\ z \in\ y) \rightarrow\ \sim Z(t,\ v,\ z,\ z')$

Combined together, theorems (20) — (23) constitute the principle of transparency, according to which when using a sign, we are thinking about the denotatum and not about the sign, its parts, its context, etc. I discussed this principle in more detail in another article, where I drew several conclusions from it and where I proved the impossibility of semantic antinomies (Koj 1963: 246—251). In order to avoid repeating myself, I shall present the principle of transparency without further comments. I shall only quote the theorems resulting from this principle and excluding the possibility of semantic antinomies in their pragmatic versions (i.e. relativised to people and time):

(25) $Z(t,\ v,\ x,\ y) \cdot zCy \rightarrow\ \sim Z(t,\ v,\ z,\ z')$
(26) $Z(t,\ v,\ x,\ y) \cdot yCz \rightarrow\ \sim Z(t,\ v,\ z,\ z')$
(27) $Z\ (t,\ v,\ x,\ y) \cdot z \in\ y \rightarrow\ \sim Z(t,\ v,\ z,\ z')$
(28) $Z\ (t,\ v,\ x,\ y) \cdot y \in\ z \rightarrow\ \sim Z(t,\ v,\ z,\ z')$
(29) $Z(t,\ v,\ x,\ y) \rightarrow\ \sim xCy$
(30) $Z(t,\ v,\ x,\ y) \rightarrow\ \sim yCx$

(31) $Z\ t,\ v,\ x,\ y) \rightarrow\ \sim x \in\ y$
(32) $Z\ (t,\ v,\ x,\ y) \rightarrow\ \sim y \in\ x$
(33) $\sim [Z(t,\ v,\ x,\ y) \cdot Z(t,\ v,\ y,\ z)]$
(34) $\sim [Z(t,\ v,\ x,\ y) \cdot Z(t,\ v,\ y,\ w)]$
(35) $Z(t,\ v,\ x,\ y) \cdot Z(t_1,\ v,\ y,\ z)] \rightarrow\ t \neq t_1$
(36) $\sim Z(t,\ v,\ x,\ x)$

Similar theorems are applicable for the use of a propositional sign.

CONCLUSIONS

In the article mentioned in the introduction (Koj 1966) I proposed a hypothesis, according to which concepts of pure semantics practiced by logicians can be defined using concepts of descriptive semantics, by means of conditional definitions. The appropriately selected and axiomatically adopted theorems of pure semantics should lead to the pragmatic theses listed above.

The theorems of pure semantics should then become elements of a theory explaining some pragmatic facts. Depending on the selection of these pragmatic facts, pure semantics would have to change, in particular when taking into consideration a broader set of pragmatic facts than before. Using pragmatic facts, it would even be possible to falsify semantic theories. Namely, there would exist ways to determine that while some theories of pure semantics explain some facts, they do not explain all of them.

I have made the first step towards the realisation of this programme. I managed to formulate several pragmatic theorems in a way which allows for a definitional and inferential connection with the theses of pure semantics. I have already made this step in my article on the principle of transparency. Here, I mainly aimed to clearly show that the pragmatic theorems derived from the principle of transparency are indeed empirical hypotheses. For this matter is not entirely obvious. In Husserl's works, the principle of transparency is simply binding, is adopted *a priori*. The empirical character of pragmatic theses is also questioned by those who believe that using signs is always conditioned by the knowledge of conventional laws of pure semantics, or law adopted *a priori* (Martin 1959, XI: "semantical notions reappear as pramatical ones."). Then pragmatic laws would have to be set by finding which rules of pure semantics are adopted by the person who uses the sign and whether these rules are indeed laws of pure semantics. In the case of the conventional laws of pure semantics or laws adopted *a priori* the latter operation cannot be empirical.

In this article, I have tried to show that pragmatics, which includes the principle of transparency, is not a derivative of pure semantics as a description of the realisation of previously formulated and experienced laws of pure semantics. Quite the opposite. When using a sign, we must fulfil certain conditions determined by the aim — that is communication — and by the possibilities given to us by our sensory apparatus and the way of processing information, called thinking. Therefore, the laws governing signs, including semantic laws, are consequences of laws governing human cognition, in particular the laws governing thinking.

The aim of this article has been achieved to some extent, as I have managed to link several subjects never linked before. I have managed to show that the problem of intentionality of signs is partly (simultaneous perception of a sign and thinking about the denotatum) related to the sender's control of his utterance and to the speed of decoding the utterance by the recipient. Generally, the problem of intentionality of signs proved to be a consequence of the problem of successful communication. Further, it was revealed that the mental non-identicalness of perceiving a sign and thinking about the denotatum (the right understanding of the thesis on the intentionality of signs) is a result of the fact that during communication we must often replace signs with their synonyms. All these topics proved to be related to the psychological law of noncontradiction and to the principle of transparency, which is further related to the problem of semantic antinomies.

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Barbara Stanosz

ON THE NOTION OF A PRELOGICAL LANGUAGE

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It is a platitude that essential differences exist between problems taken up within the logical theory of language and those taken up within linguistics. It is also commonplace that even when a problem receives the same formulation in both disciplines the logician sometimes approaches it using different research methods than the linguist, and two research methods often yield divergent solutions. These facts do not usually result from lack of interdisciplinary contacts (though surely such contacts are worth cultivating), but from genuine dissimilarities between the theoretical issues that figure under the same heading in both sciences. The question about the notion of the meaning of linguistic expressions (or the necessary and sufficient conditions of synonymy), which has a different meaning for the logician than for the linguist, is a case in point: while the logician is interested in so-called cognitive synonymy, the linguist concerns herself with a more restricted notion of synonymy, which, besides guaranteeing sameness of cognitive content, implies sameness of expressive value and preserves other parameters that should be retained in literary translation. In this example, the two identically formulated problems differ from each other because the term "meaning" (or "synonymy") has two distinct interpretations. However, usually the reason for such discrepancies is that each of the two disciplines relies on its own notion of language. In this respect, the logician is rather like a chemist who solves a problem in laboratory conditions, whereas the linguist is more like an applied chemist employed at a large factory who faces a similar problem, but on a quite different scale and under specific conditions. The applied chemist must

adjust the laboratory results to her own problem, factoring in the degree of chemical purity of the substances involved, the accuracy of the measuring instruments, etc.; in an extreme case, the laboratory results may prove to be of no help whatsoever in solving the industrial problem. The practical value to linguistic research of the solutions and constructions offered by the logical theory of language is much the same. While logical analyses focus on artificial languages (especially on unnaturally simple model languages constructed so as to meet specific research desiderata), linguistic analyses concentrate on incomparably richer ethnic languages, which emerged spontaneously and are constantly in a state of flux. In logic, any system is classified as a language so long as it comprises: 1) a fixed inventory of expressions (defined by way of enumerating basic expressions and specifying the rules of construction for complex expressions), and 2) a complete set of rules of interpretation, which assign particular meanings to linguistic expressions. Although the structure of objects studied by the linguist is similar, their elements are fluid and indeterminate, defying exact specification. Consequently, many results yielded by the logical analysis of language[1] can be applied to languages studied in linguistics only "in approximation" and after suitable modifications; and there are likely logical constructions that cannot usefully be employed in linguistic research at all.

Thus, the linguist is fully justified in distrusting the logician's solutions to problems falling under the purview of both disciplines. The linguist should investigate the assumptions of such solutions and, having discovered that the assumptions are not satisfied by the natural languages she intends to study, she should either modify the solutions accordingly or decide not to use them at all.

Sometimes, however, a linguist's misgivings about the semiotic results obtained in logic and her attempts to modify or restrict those results for the purposes of analyzing natural language rest on a misunderstanding. The question of whether or not the laws of formal logic hold in a particular natural language is a typical example of this.

The logician assumes that any language she studies contains expressions known as logical constants, which are investigated by formal logic. The logical constants that are usually mentioned in this connection include the

[1]In any case, this is true of the work of so-called reconstructionists, most notably Carnap, who continues the tradition of logical positivism in this respect. Alongside reconstructionism, a different approach to language is being developed by Ryle, Strawson and others, which, at least programmatically, is closer in its aims to linguistics — it is known as the philosophy of ordinary language.

truth-functional operators of negation, conjunction, disjunction, implication and biconditional (designated by the symbols $\sim$, $\wedge$, $\vee$, $\rightarrow$ and $\equiv$, respectively), the quantifiers $\forall$x and $\exists$x, and sometimes a few other expressions. Logical constants have determinate meanings, posited by the axioms of logic and elaborated by logical theorems. For instance, the following theorem of propositional logic:

(1) $\quad p \vee \sim p$

characterizes the constants $\vee$ and $\sim$ as the kind of expressions that produce a true statement when they are conjoined with two tokens of any statement in the same way as they are combined with the letters p in (1). In logic, a statement obtained from a logical theorem by consistently replacing every variable symbol with any linguistic expression, as long as it is of the same of syntactic category, is called a logical truth of that language; philosophers classify such statements as necessary, analytic or a priori truths. An essential property of such sentences is that, since they are true by virtue of the meaning of their component expressions (namely, the logical constants), one cannot dissent from them without violating the rules of the language to which they belong.

When the object of analysis is a particular natural language the problem arises of identifying the logical constants of that language or, in other words, of finding the linguistic equivalents of the symbols $\sim$, $\wedge$, $\vee$, $\rightarrow$, $\equiv$, $\forall$x and $\exists$x. The challenge is to discover which expressions of the language under investigation satisfy the axioms of logic when they occur in the same places as their corresponding symbols. For example, the claim that the logical constants of the English language include, correspondingly, the expressions: it is not the case that, and, or, if . . . then, if and only if, for any x and there is an x such that, is equivalent to the claim that the semantic rules of the English language force one to assent to any statement that has been obtained from any logical theorem by way of a consistent replacement of its (free) variables by any English expression, the symbol $\sim$ by the expression it is not the case that, the symbol $\wedge$ by and, etc.; in other words, a denial of a sentence such as

John is a hypochondriac or it is not the case that John is a hypochondriac

should be treated as a violation of the meanings associated in English with the expressions it is not the case that and or. In other words, someone who utters a denial of this sentence must be assigning a non-standard meaning to at least one of the expressions and so, in a way, "is not speaking

English."[2]

So how can one understand the claim that, in a given language — let us designate it by L — all the laws of logic hold? It seems that, on its simplest interpretation, the claim would boil down to the assertion that L contains expressions that are accurate translations (in the sense specified above) of all logical constants. Correspondingly, the claim that some law of logic — say, the law of excluded middle, given in (1) above — does not hold in L would amount to saying that L does not contain an expression that is an accurate translation of some (at least one) logical constant — in the case under discussion, of the constants $\vee$ or $\sim$. Naturally, the fact that law (1) does not hold in L would immediately entail that no law containing both $\vee$ and $\sim$ can hold in L, and also that the laws that do not hold in L include either all the laws containing $\vee$ or all the laws containing $\sim$. That there are natural languages that lack expressions corresponding to particular logical constants has been confirmed by empirical research.[3] Therefore, we can compare various languages with respect to how well they conform, in this sense, with logic; and we can use the term prelogical languages to denote languages with an extremely limited repertoire of expressions corresponding to the logical constants.

However, for a variety reasons, the term itself is rather unfortunate and, in any case, a taxonomy of natural languages determined only by the number of logical constants they contain does not seem to hold much methodological interest.

The term prelogical language carries with it certain presuppositions that rest on the aforementioned misunderstanding regarding the question of whether or not all a given law of logic holds in a given natural language. For instance, some works in linguistics (and ethnography) (see e.g. Malinowski 1935; cf. Quine 1960: 58f) contain a claim to the effect that, in some languages, some laws of logic, which feature only logical constants that have their equivalents in a given language, do not obtain (one law that is often cited in connection with this is the law of contradiction). The claim in question is usually formulated in the context of a description of the culture of some

[2]When it comes to natural languages, answering these kinds of questions is no easy matter because the semantic rules of natural languages have not been codified. In order to arrive at an answer, one needs to reconstruct them on the basis of sufficiently many observed acts of language use. In the case of dead languages, the problems are additionally amplified because one cannot induce the appropriate linguistic behaviors to observe.

[3]For example, ancient Chinese does not have a word equivalent to the logical operator of disjunction (Chmielewski 1963: 104-105).

primitive tribe and serves as a basis for characterizing the tribe's language and the mentality of the tribe's members as "prelogical." And this property of prelogicality is in turn taken to be the reflection (or the source) of an alleged inability of members of the tribe to engage in theoretical thought. Other works defend some natural languages against the charge of prelogicality and attempt to show that the basic laws of logic do hold in those languages; to this end, they often employ sophisticated conceptual distinctions (e.g., between the laws of logic holding "directly" and "indirectly") and cite a wealth of examples (Chmielewski 1963, 1967). It is easy to see that both sides of such disputes have fallen victim to a misunderstanding: the notion of a prelogical language, in the sense just specified, is internally inconsistent, therefore we know a priori that prelogical languages do not exist.

Consider a toy example. Let us imagine a situation in which researcher R is confronted with community C whose members speak language L such that R is unfamiliar with L. R will learn about L by observing the linguistic behaviors of members of C and pairing the linguistic expressions of L with the linguistic expressions of R's native tongue, L′ (which we assume to contain a full repertoire of logical expressions). Now suppose that, based on available observations, R forms the hypothesis H to the effect that two expressions of L — let us represent them as E1 and E2 — are equivalent to negation and conjunction in L′, respectively. Suppose further that, having accepted H, R is fully justified in translating expression E3 of L into a sentence of her own language L′ such that the sentence is a substitution instance of the law of contradiction:

(2) $\sim(p \wedge \sim p)$.

If H is correct then E3 is a logical truth of language L, which means that E3 is a statement that is accepted by every speaker of L. So if someone rejects E3 (either by asserting ∼E3 or by refusing to accept either E3 or ∼E3) then at least one of the following is the case: either H is false or the person in question — whether or not she is a member of C — is not speaking L at the moment. In order to ascertain which of these possibilities obtains, R has to appeal to further observations. It seems that R should establish whether members of C reject E3 (as well as other sentences of L that, assuming H, have the logical form of (2)) frequently or only in "special circumstances." Moreover, R should also find out whether or not a rejection of E3, when it occurs in conversation, inhibits communication (e.g., causes the hearer to exhibit signs of surprise or confusion). If it turns out that, in the process of communication, members of C almost never reject sentences that, assuming H, have the logical form of (2), and it also turns out that,

when such a rejection does occur, it inhibits communication, then R will be justified in retaining H or even claiming that H has gained additional empirical support. Otherwise, R has to drop H. But R cannot maintain, on pain of inconsistence, both that E1 and E2 are equivalent to negation and conjunction, respectively, and that one can reject any sentence of L in which E1 and E2 have the same syntactic function as the symbols $\sim$ and $\wedge$ in (2) without, at the same time, violating the rules of language L (or ceasing to speak L). The character and refinement of the culture of C and considerations such as the fact that many beliefs accepted by members of C may strike us as flagrantly irrational are completely beside the point.

The claim that particular laws of logic do not apply within this or that language is not always conjoined with the disparaging contention that the language in question should be classified as prelogical (although it usually is accompanied by some disapproving opinion or other). For example, it is not an uncommon view that the law of double negation, namely:

(3) $\sim\sim p \equiv p$,

does not hold in some ethnic languages (including Polish). In the case of the Polish language, this assertion is illustrated with sentences such as these:

(A) Nikt nie przeczytał wszystkich książek [Nobody not read all the books*]

(B) Nigdzie nie występują złoża uranu [Uranium not occurs nowhere *]

(C) Nigdy nie istniał ustrój prawdziwie demokratyczny. [A truly democratic system never did not exist*]

It is suggested that each pair of expressions: nikt — nie, nigdzie — nie and nigdy — nie, serves as a string of two negations which, however, do not "cancel each other out" because the statements above are not synonymous with the corresponding statements below:

(A′) Ktoś przeczytał wszystkie książki [Someone read all the books]

(B′) Gdzieś występują złoża uranu [Uranium occurs somewhere]

(C′) Kiedyś istniał ustrój prawdziwie demokratyczny. [At some point a truly democratic system did exist]

In fact, they are synonymous with the denials of their corresponding statements.

Considerations similar to those we have discussed earlier speak for a different construal of these sorts of cases. The fact that statements (A), (B) and (C) are not synonymous with (A′), (B′) and (C′), respectively, does not support the claim that the law of double negation does not hold in Polish;

on the contrary, it shows that the former are not double negations of the latter. The Polish words nie [not], nikt [nobody], nigdzie [nowhere] and nigdy [never] are not equivalent to negation. And they have a different syntactic function to perform in Polish sentences than does the symbol $\sim$ in logical formulas. The correct translation of this symbol into Polish is the expression nieprawda, że [it isn't true, that] — which is clear because, among other things, any Polish statement preceded by two consecutive occurrences of the expression nieprawda, że is synonymous with the original statement.

On the other hand, the fact that (A), (B) and (C) are synonymous with, respectively:

(A″) Nieprawda, że ktoś przeczytał wszystkie książki [It isn't true, that someone read all the books]

(B″) Nieprawda, że gdzieś występują złoża uranu [It isn't true, that uranium occurs somewhere]

(C″) Nieprawda, że kiedyś istniał ustrój prawdziwie demokratyczny [It isn't true, that at some point a truly democratic system did exist]

shows that there is a connection between the Polish words nie, nikt, nigdzie and nigdy and the logical operator of negation. This connection can be articulated by pointing to the fact that the phrases nikt nie, nigdzie nie, nigdy nie are interchangeable with phrases featuring the Polish equivalent of negation, namely: nieprawda, że ktoś [it isn't true, that someone], nieprawda, że gdzieś [it isn't true, that somewhere], nieprawda, że kiedyś [it isn't true, that sometime]. This is not a complete characterization of the connection in question; for example, in certain special situations the word nie can perform the semantic function of nieprawda, że alone (but then it has a different syntactic function than in the examples above). However, in Polish neither nie nor nikt, nigdzie or nigdy are equivalent to negation. Thus, their concatenation need not mimic the superposition of negation.

Let me repeat the acceptable interpretation I proposed earlier of the claim that a given law of logic does not hold in a given language. According to this interpretation, the claim asserts that the language in question does not contain an expression equivalent to at least one logical constant occurring in that law. I have also contended that comparing languages in terms of the number or kind of logical constants they contain is not a theoretically fruitful enterprise. This is because some logical constants can be defined in terms of others and thereby eliminated. In particular, as is well known, the equivalents of all logical operators in the propositional calculus are reducible to a single constant (and the same, mutatis mutandis, goes for quantifiers). Therefore, a language containing only Sheffer's stroke and the universal

quantifier will be no logically poorer than a language featuring all logical constants of the propositional calculus and both quantifiers (though it will suffer from some pragmatic shortcomings such as verbosity). However, it is logically possible to have a language in which one cannot obtain certain logical constants by means of definitions (e.g., a language where the only logical constants are conjunction and disjunction, or a language without quantifiers). Such a language would be essentially logically poorer and its capacity to express claims and scientific theories would be severely limited. Research into the repertoire of logical constants in languages of primitive tribes, as well as into the gradual expansion of such repertoires in the languages of civilized nations may establish some correlations between the logical richness of a language and the relative development of theoretical thinking in the community of its speakers. It would also be interesting to see if there is any dependence between the process of expanding the inventory of logical constants by adding to it redundant items and the advancement of science. Such research might shed light on the optimum redundancy of logical components of language.

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Witold Marciszewski

ON METHODS OF ABSTRACTING AND TYPES OF ABSTRACTS

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0. Introduction

0.1. Functions of abstracts

The phenomenon of "information explosion," consisting of a disproportion between the pace at which science generates new information and the pace of this information being found and assimilated by the addressees, breeds a double, urgent need: the need to improve the manner of searching for information, and the need to perfect the manner of processing thereof, so that the information is capable of being assimilated within an adequately short time. Some methods of coping with this problem consist of the use of the most state-of-the-art and potent technical means, such as computers, others consist of exploiting the traditional forms, which also should be perfected in order to meet the new and greater requirements.

One of the traditional forms of information processing is an abstract. Apart from the utility aspect of the abstract, its didactical aspect is also noteworthy; since preparing an abstract is a great exercise and a test for many of our mental capabilities at the same time: attention, the ability to abstract (from the less important details), the ability to see the construction of the text, and finally, the ability to paraphrase expressions and to concisely formulate thoughts. Moreover, a ready abstract, as well as the process of preparing it, sometimes happens to be a useful device for the better understanding of the abstracted text and by assessment of its substantial and

formal value. Therefore, in some educational systems a lot of emphasis is put on exercises in making abstracts. The present deliberations focus on those aspects of intellectual activity which consist in generation of thought "concentrates." We will be mainly interested in abstracts of scientific texts; abstracts of literary works are a separate issue which requires the means belonging to the workshop of a literature theoretician. This work does not discuss the issue of mechanical abstracts, which would require a separate elaboration.

0.2. Basic notions

The basic notions to which we will refer are the text and text transformation. These are considered to be the primitive and commonly understood notions. They cannot be attributed perfect sharpness; in particular the notion of the text may raise doubts; does the notion of the text comprise for example a monologue of a schizophrenic, the shouting of a coachman, the humming of a nanny, where part of the lyrics have been forgotten, etc.? It will be therefore convenient to make this notion more precise by imposing a condition on the text that needs to contain at least one sentence and needs to be constructed in accordance with the grammatical rules of a given language (let us add "generally," since single grammatical errors, which may occur in a text, do not result in gaps or interruptions in it). Such specifications, far from being perfect, will be sufficient for our purposes.

The notion of text transformation creates less doubts. It means any change consisting of the omission or addition of an element. It will, however, be convenient to make a terminological agreement that text transformation will signify any change, which by changing the shape or the tone of the text, sustains some desired (in a given case) quality of the text, e.g. its meaning, stylistics, emotional quality, or what is described by the most imprecise, yet important notion of "fundamental thought."

An abstract is exactly a type of transformation that sustains the "fundamental thought" by considerably shortening the length of the text. We do not need to worry here about the ambiguity of the term, since the difficulties with defining it may be evaded by listing the operations on the text resulting in the product called an abstract. It may be stated that a transformation sustains the "fundamental thought," if (but not only if) it was prepared with the use of one of the operations discussed below.

From now on a text will be called an abstract, if it was constructed as a result of the activity of abstracting; the text subject to the process of abstracting will be called the original text, and the rules specifying correct

operations resulting in creation of an abstract will be called the abstracting rules.

Each of the following three parts shall be devoted to a different type of operation aimed at the generation of a specific type of an abstract.

1. Image generation operation

1.1. Multi-stage text division

1.1.1. This operation, which can by compared to the construction of a map, is possible to be performed only on a text which can be divided; so that, for example, a certain novels' characters' monologues, constructed on the basis of an uninterrupted series of association, would not be capable of being abstracted this way. Provided that it is possible to distinguish certain segments in the original text, and these may be in turn divided into sub-segments, etc., then we have the image of text construction. This structure may be presented with the use of the well-known method of positional notation. The segments separated as a result of the first-degree division are ascribed one-positional numbers, e.g. 1, 2, 3. If these segments were to be divided further, they would be ascribed new two-positional numbers, subordinate to the numbers of the divided segments (particular positions are separated by a dot): 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, etc. The segments generated as a result of the next, third-stage division shall be ascribed with numbers composed of three positions, etc.

1.1.2. If we make the next step, ascribing each number a title informing of the content of a given segment, then we will get a product called a table of contents. The role of the table of contents is to list the topics or the problems; therefore the titles contained therein have the form of names or questions.[1] It

[1]In view of the ambiguity of the word "topic," it needs to be explained which of its many meanings we have in mind here. Using the analyses contained in the work of J. Pelc(1961), I suggest understanding the word "topic," for the purposes of the present deliberations, as a notion or a judgment pertaining to the subject of a given text. Not going into detailed deliberations as to how the phrase "subject of a text" should be understood, I will limit myself to exemplary explanations; and thus, for example, the subject of a handbook for a bee-keeper are the bees and the actions connected with keeping bees, the subject of Josephus' work is the war between Jews and Romans, and the subject of an arithmetic handbook are numbers, their properties and relations. Notions and judgments will here be understood as classes of abstraction from the relation of logical equivalence, dividing the set of names and the set of tasks of the

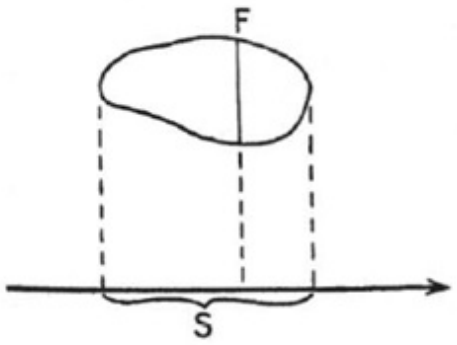
does not contain, however, an elaboration of these topics or answers to these problems. If, however, one provides such formulations, assigning each point to the table of contents, i.e. each name or question, a relevant sentence in indicative mood, one will as a result obtain an abstract. Such an assignment is easy to specify, if the title is a question. It then consists in formulating an answer to the question. If the topic of a given segment is a name, then in many cases it is possible to transform it into a question on the basis of certain current conventions concerning the formulation of titles. And so, for example, we understand that under the title "*Fields of logic*" we will find the answer to the question "What are the fields of logic?" The phrase "*The classical notion of a quantifier*" may be read as the equivalent of the question "What is a quantifier in the classical sense?" The title "*Image generation operation*" promises an answer to the question "What does the image generation operation consist in?" Sometimes it is difficult to select a relevant question. This seems to be the case in particular when the title is formulated in a very general manner or if it announces an activity or a task intended by the author. Both of these features are for example present in a title of a chapter of a certain logic handbook, which was formulated in the following manner: "Logical analysis of the basis of mathematics." Nonetheless, in this case we also have a certain trick available, transforming this statement into a question, without interference from the author's intention. In this case we may ask the following question: "What are the segments of the logical analysis of the basis of mathematics?" Selection of a correct question should of course be dictated by the knowledge of the text, and its aptness will reveal itself in the fact, whether each of the whole answers to the questions constituting the titles of the sub-chapters will be a partial answer to the question constituting the title of the chapter.

1.1.3. Multi-stage division of the text, being the basis for this type of abstract, may be a good starting point, when one is presented with a task of abstracting a certain text with the use of a particular number of words, e.g. 1,000 words, 500 words, etc. A more concise abstract may be obtained by omitting the segments which have been distinguished at further stages of the division, whereby a more extensive abstract also includes such segments. The more numerical positions a number of a segment has, the faster it will be left out, if we increase the requirements of conciseness.

language in which our text is written.

1.2. Set theory characterisation

A table of contents generated by means of classification is characterised by the fact that it constitutes approximately what in the set theory is described as a set (of sentences) being an image of another set (fragments of the original text distinguished as a result of the division), in accordance with a certain unambiguous relation. For the sake of a convenient expression we will extend the notion of text image so it also includes abstracts that are a result of the abovementioned transformations of the table of contents (although we are diverging this way from the definition of the set image according to the set theory).



In the geometrical interpretation this might be depicted as a projection of a plane on an axis, where to each set of points of a plane (sentences of the original text) lying on a certain segment F (a fragment of the original text) there corresponds exactly one point (sentence) on the axis; set S of all such points on the axis corresponds to the set of sentences constituting the abstract.

If this unambiguous relation, i.e. the function transforming a set of the sentences of the original text into a set of sentences of the abstract, is here conventionally called by us titling (in the sense that each sentence of the abstract is immediately, or after a relevant transformation, ready to be a title of a given segment), then the definition of an equivalent type of abstract will be very short: such an abstract is the image of the original text in accordance with the titling relation.

This set theory description is of course a far-fetched simplification or an idealisation. In reality, we need to make compromises dictated i.a. by didactical or stylistic reasons, which obscure this non-ambiguity of the mapping

of the original text by the abstract. Nonetheless, this idealisation seems to belong to the family of useful fictions, setting a certain ideal type of abstract, which actual abstracts approach, when possible or needed (cf. Suszko 1965).[2]

2. Selection on the basis of relevance assessment

2.1. Comparison with the image generation operation

Each abstract is created as a result of omitting not only formulations, but also certain information. Generation of text image also requires omissions, but this is done in accordance with the criterion which could be called structural: one includes into the abstract formulations derived from particular points of the table of contents (which determine the structure of the text) and the remaining formulations are omitted. This criterion, imposed so to say by the text itself, might be called objective or internal, contrary to the criterion brought from the outside by the abstracting person, who by preparing the abstract uses certain assessments of relevance with respect to particular parts of the text. And thus for example an author of a review belonging to the borderland of several disciplines may undertake to report only certain traits, which lay within the field of his expertise. It is thereby possible to transcribe some fragments of the text, namely those, which are considered to be particularly important for the point of view assumed (e.g. definitions, key theses or formulations of the material points striking with their aptness).

It is difficult to list all possible relevance criteria, since there are as many of them as there are points of view on various texts. One needs to mention a few, which are connected more with the qualities of the text itself, although the external point of view is not completely neutral to them. Above all, we will list here the quantitative criteria, and then also other criteria, which could be described as qualitative.

The text of an abstract generated as a result of such operations will be called a selective excerpt from the original text.

2.2. Some relevance criteria

2.2.1. The method of selection of the topics which should be included in an abstract, based on the criterion of the frequency of word appearance, deserves particular attention. This is due to its usefulness in the process of

[2] An example of such an abstract is the abstract published at the end of this article.

abstract mechanisation, which leaving a part of the work to the machines, makes it possible to speed up the entire process, which is greatly desired in the cycle of informing about the documents. The first step is to calculate the frequency of appearance in the text of terms belonging to a certain specific class (let us mark it with the letter C). In special cases this class may be a product (within the meaning of the set theory) of two or more classes; we may, for example, be interested in specialist terms from a given field, which are nouns. The point of view brought in by the abstracting person is expressed by the choice of class C, potentially by selection of a fragment of the text, which is to be subject to examination; as well as by selection of one more indicator, which may be called the distribution indicator. The latter is important since concentration of a certain expression (and in particular of cases that use such expressions) in a certain fragment (e.g. in a given chapter) indicates that this is a topic which enjoys particular attention in the original text. Further, distribution of a certain expression throughout a given text, e.g. in an entire book, may be a sign that the expression is less specific. And so for example in the book written by R. Carnap *Meaning and Necessity*, the expression *state description* appears 31 times, whereby 28 instances of its appearance have been noted on four subsequent pages of the book. The word *method* appears several dozens of times on 22 (in aggregate) non-subsequent pages. This suggests an assumption that a special fragment of the book has been dedicated to the notion of the *state of description* and therefore that this notion belongs to the set of topics discussed in the book, whereas the word *method* appears as a less specific term, taken from the most commonly used vocabulary. Indeed, the author of the present remarks, abstracting *Meaning and Necessity* three times (one time, from the point of view of the theory of meaning, the other time reporting the theory of necessary sentences, and finally reporting the issue of intentionality), and each time could do without the word *method*, but also each time was forced to use the phrase *state description*, which appears as an indispensable link in the line of definitions leading to the definition of the necessary truth, meaning and intentional structure.

If having calculated the frequency of appearance of various terms, we order them in a series, starting from those appearing most frequently, then the first segment of this series will provide us with a list of terms which will determine the subject matter of the abstract. This result may potentially be modified by means of the distribution factor, i.e. elimination from this list of the terms with too broad (i.e. exceeding certain specific threshold) distribution, and inclusion of the terms of high concentration, even if their

number is not equal to the number of the appearances of the terms at the beginning of the series.

2.2.2. Other criteria of selection and omission may be called, contrary to the above criteria, qualitative. A common method, although applicable only to a part of the texts, is to construct the text in accordance with certain logical and methodological criteria, consisting therein, that one selects from the original text only the formally distinguished formulations, such as theorems, definitions and proofs. This is a specific case of a more general procedure of distinguishing the genres of statements, resembling the distinguishing of literary genres. Undoubtedly, definitions, proofs and theorems have their own specific stylistics, which qualifies them as a particular "literary genre." Other "genres" appearing in abstracted texts provide a basis for omission of certain fragments of the text, in such a manner that the contents of these fragments does not have the slightest reflection in the abstract. And thus for example in an abstract of a book one does not include quotations, which were included by the author in the book (although, for example, in historical works quotations may constitute a considerable part of the book). In abstracts of mathematical or formal-logical works, one provides the results, omitting the proof. In abstracts of empirical research one provides results, omitting the research protocols. Summing up, the rule is to report the results with the omission of the justifying material. One usually also omits all kinds of exemplifications, which include material from the didactical point of view, yet unnecessary for the reporting of the main thoughts of the texts. It is also advisable to omit subjective elements of the contents, such as polemical remarks, digressions, signalisation of the topic, etc. Fragments of the text which repeat the thought of some other fragment are also doomed to be omitted (this omission criterion is more formal, and does not refer to the "literary genre").

An abstract prepared in accordance with the qualitative omission criteria may sometimes result in the same results, in whole or in parts. The mode of conduct is each time different, however. By image generation we need to get to know the structure of the entire text, i.e. read it in full, and then characterise thematically each separated fragment. By application of the technique of omission in accordance with a criterion adopted in advance, we may abstract the text by rejecting the fragments that are to be omitted in the course of the first reading of the text, and then by rewriting the remaining fragments in whole or in an already abbreviated form obtained thanks to the use of yet another method. This may prove to be a more

economical procedure, requiring less time and mental effort than an attempt to grasp the text structure. Such attempts may be a potential next step, if we are already dealing with a more easily operable "preparation," generated as a result of deletion of fragments considered to be immaterial in view of the intended purpose of the abstract.

3. Metalanguage or reported speech description
3.1. Characteristic features of a metalanguage abstract

This is an abstracting method applied often in short abstracts of professional accomplishments and in documentary descriptions. Here are two examples.

Example 1. "This work is an attempt at systematising those constructions of formal logic, which are used in contemporary semantics to explain the traditional notions of the extension (denotation) and intension (meaning, connotation) of expressions. Subject to description are the general scheme and particular steps of the theoretical procedure, usually applied for this purpose. Examples under consideration are R. Carnap's constructions, introduced in his intension and extension theory, and the notions introduced by R. Suszko and E.W. Beth, partially patterned on Carnap's ideas. The work also indicates possible modifications of the notions within the theoretical procedure scheme commonly applied to them" (Stanosz 1964).

Example 2. After a general description (author, title, etc.) there appears (on the documentation sheet) the following sentences: "Research on reduction of noise generated by work of jet engines, carried out in the US. As a result of the research it has been ascertained that the noise level is a function of..." etc. (Osmólska 1965: 107).

Such modes of preparing abstracts is characterised by the fact that it uses metalinguistic expressions (e.g. "subject to description is the general scheme the theoretical procedure") or reported speech (e.g. "it has been ascertained that..."). Is this a feature of merely stylistic character, or is it also a feature of the manner of functioning of the abstract, expressed in its applications, qualities, disadvantages, etc.? It is not difficult to notice that it also affects the functioning of the abstract. Abstracts prepared in the same language as the language of the original text have to use this language's vocabulary, and cannot use information which is not contained in the original text, and it is impossible to express therein the point of view of the author of the abstract. These are the limitations not applicable to a metalinguistic or a reported speech abstract. Therefore an advantage of the latter is that it is possible to make moves, which sometimes resemble

the activity of commenting. Commenting, however, causes problems and difficulties, which constitute the darker side of this type of abstracts. Let us now look in more detail into the pros and cons of such abstracts.

3.2. Advantages of commenting abstracts

Data, inexpressible in the language of the original text, but expressible in the language of the person preparing the abstract or using knowledge from outside of a given text, may be very valuable for the user of an abstract. And so our example 2 provides the message that the work was performed in the US; this message does not need to be explicitly contained in the original text, but it may sometimes be inferred, either from the original text or even from some additional sources (e.g. from the correspondence of a library with the publishing house).

If an abstract contains the following expression: "the most important result of the research is," then we are using an assessment made perhaps only by the author of the abstract, since the author of the original text did not have to introduce such valuation of his results or had a completely different point of view with respect thereto the abstracting person and the intended user of the abstract. Such an assessment, provided that it is apt, may be very valuable for the user, informing him, for example, of the upper limit of the achievements or drawing the user's attention to the most important things.

Another possibility, provided by this type of the abstract, is the possibility of informing the reader of the point of view assumed by the abstracting person, which was the basis for selection of the material for the abstract (e.g. the fact that the abstracting person has omitted the description of the basic research reported in a given work and discussed their practical application).

In other cases, thanks to this form, it is possible to achieve greater conciseness without any harm to the desired information. It is said for example that "the author explains his thesis with the use of numerous examples," however the examples are not provided, since such a remark itself achieves the intended purpose, i.e. informing the user of the degree of usefulness of the book. In an abstract which does not enjoy the privileges of a commentary, there is no room for such forms; it would be necessary to present or summarise such examples, or omit them altogether.

Example 1 illustrates one more interesting feature of this form, namely the fact that it makes it possible to refer to the assumed knowledge of the recipient with the use of expressions such as "traditional notions," "generally

acceptable scheme." If such things are commonly known, then it is sufficient to remind the reader of them, instead of describing them, in a way in which this is perhaps done in the original text for order's sake.

Taking this opportunity it is worth mentioning a certain problem, material for the theory of abstracts, although loosely connected with the division of abstracts discussed herein. It is possible to have an abstract be more informative (by the same capacity), if one relies on the assumed knowledge of the user, which is possible to be referred to with the use of the metalinguistic form of the abstract. The relation between the information carried by the abstract and the relevant user's knowledge may be presented in several different ways. This might be facilitated by the application of the semantic information theory, which contemplates various ways of information relativisation, whereby information carried by a sentence is defined as a certain decreasing function of the logical probability of the sentence. This may either be the so-called conditional information, being a function of conditional probability, or the so-called additional information (increase of the information in relation to the previous knowledge), or even other types of information, which we are dealing with when a given sentence makes it possible to infer some other sentence (analogically to the situation when a signal or a sign informs of something that it signifies). Each of these three cases may take place through consideration of the relation between the abstract and the knowledge of the user.[3]

We have presented above just a few from among many useful formulations obtained by means of enrichment of the original text language by the language of the author of the abstract. On the other hand, in order to see the difficulties, one needs to draw one's attention to certain characteristic features of those statements concerning the original text, resulting in the fact that the abstract has certain features of a commentary.

3.3. Problems with commenting

It is impossible to analyse herein the notion of a commentary in any greater detail. This would be a topic of a separate study, which should take into account the experiences of the middle ages — an era when commenting on authoritative texts was one of the main forms of theoretical work and didactical activity.

The principal problem for the assessment of a given commentary is the

[3]As far as the author is aware, the fullest division of the types of information has been presented in the work by J. Hintikka (1968).

question, does the commentary actually renders the thought of the original text? This question bears a series of further issues: what is this "thought of the original text," to what extent it is possible for us (if we know it already) to render it in a language other than the language of the original text, to what extent is it admissible to use the notional apparatus and the knowledge of the commentator? It is impossible to answer these types of questions in this work, yet it is material to signal that they exist, in order to demonstrate the risk of errors carried by a commentary, i.e. also by an abstract of a commenting character.[4] And thus certain interpretational problems appear, when one reads an abstract of a book by D. Defoe *The Complete English Gentleman*, written by Maria Ossowska. The abstract i.a. contains the following fragment: "Although Defoe praised the life of the middle class, he aspired higher and it is possible to find, written between the lines, a desire for social promotion, which however has not been explicitly expressed" (Ossowska 1956: 137). A striking feature of this formulation is the mention of reading between the lines. Do the results of such reading have the right to be included into an abstract? We are not deciding here, whether the quoted text, according to its author's intention is an abstract or something else. It appears to be one, provided that an abstract is to express the most important ideas of the text, and the most important ideas in this case might be exactly "between the lines." Nonetheless, the process of arriving at such a commenting hypotheses is complicated, and in many cases exposed to the risk of errors. Interpretational disputes, often referring to the texts of abstracts, provide countless examples of not only what is between the lines, but also what is in the lines and is subject to various, contradicting interpretations. This is particularly sharply visible in the case of abstracts presented by polemists, where each of them reports the thought of his adversary.

Such problems are not as sharp in small abstracts and in documentary descriptions, yet they appear there as well, although in a relevantly mitigated form, among others, due to the fact that descriptive words are seldom free from a certain emotional or valuating charge. When we say that "the author

[4] A typical grammatical form used for commenting is the reported speech. Reporting the content of a given text with the use of reported speech bears logical problems connected with so-called language intentionality, which are discussed in many semiotic theories. This type of review is contained in the article titled *Intencjonalność w Małej Encyklopedii Logiki* (Wrocław 1969). Another proposal, stemming from the analysis of specific functions of reported speech, has been presented in the work by W. Marciszewski *Funkcje semantyczne mowy zależnej*, which is to be published in the selection of Polish semiotic works, ed. J. Pelc, which is to follow.

has proven," we are not only describing the author's activity, but also the results of such activity, and on top of that we assess such results as positive. It is possible in such instances to use more neutral, less judgemental words, yet it is possible to allow such valuating on purpose. This depends on the purpose of the abstract, and as a practical rule for proceeding one should recommend the abstracting person to always ask themselves the question what is the purpose of the abstract and what means will realize it the best.

4. Comparative remarks on the types of abstracts

4.1. Classification of abstracts

The list of the types of abstracts presented above does not constitute a (correct) logical division, since it has been prepared on the basis of two different rules: rule no. 1 based on the selection of the structure of the original text (expressing the assessment of the relevance of the topics made by the author of the text) or based on some other relevance criteria adopted by the author of the abstract; rule no. 2: adopting only the language of the original for the abstract or extension of the language of the original by metalinguistic expressions, reported speech and potentially other elements of the language of the author of the abstract. The first division provides the text images and selective excerpts from the text, the second one provides non-commenting and commenting abstracts. Crossing two divisions independent from each other resulting in four types of abstracts: non-commenting excerpts, commenting excerpts, non-commenting images, commenting images. One may have objections to the latter type of the abstract, since it constitutes a far-fetched departure from the idea of the text image. It is pointless to argue about words at this point, since having extended the notion of the image (cf. 1.2.), we have not drawn the limits of this extension precisely enough. It is only material to note that the text image in the strict sense of the term, i.e. the table of contents, may also be the basis, as a result of relevant linguistic transformations, of a commenting abstract.

It is also possible to obtain other kinds of abstracts as a result of mixing up the types of abstracts resulting from the first division. It is namely possible to make an abstract of an abstract in such a manner, that from an image of a certain text one makes a selective excerpt and for such an excerpt one creates an image in accordance with the titling or some analogous relation. These actions may be repeated or mixed several times. Such mixing procedures can possibly prove to be the most useful and the most commonly

applied in practice, e.g. by preparation of author-generated abstracts.

By image generating operations (within the strictest sense, i.e. as a table of contents), there also take place familiar set theory relations: an image of a sum of two sets is equal to the sum of images of these sets, e.g. an abstract of a two-chapter text (we treat each chapter as a certain set of sentences) is equal to the sum of abstracts of the first and the second chapter (again treated as sets of sentences). Further — if one set is contained within the other, then the image of the first set is contained in the image of the other set, e.g. an abstract of a chapter of a book is contained in the abstract of the book itself. These simple and obvious dependencies do not occur in the case of abstracts being excerpts. A selective excerpt from a book may, as a result of the adopted selection rule, omit entire chapters, or, for example, report in one sentence the content of two chapters, and therefore it will not be a sum of the excerpts of particular chapters.

4.2. Abstracts on documentary sheets

It is worth confronting these descriptions of abstract types, resulting from rather theoretical deliberations with a certain important division of abstracting practice, which is a part of the documentalist's activity. Certain rules of this activity are formulated in the *Code of Good Practice for Scientific Publications*, issued by a special UNESCO committee.[5] This publication contains a *Guide for preparation of author's abstracts*, which in point 7 reads: "It is valuable to indicate the treatment of various aspects of the subject by qualifiers such as brief, exhaustive, theoretical, etc." Therefore, this point, similarly to the other points of the *Guide*, recommends the metalinguistic form for abstracts even with an assessing commentary. Including valuating remarks results in the fact that the abstract as a whole will no longer be an image of the text (although its fragments may be the images of relevant fragments of the original text).

A similar form of the abstract is also stipulated in another publication, issued under the auspices of UNESCO by the International Federation for Information and Documentation (FID), namely a handbook by O. Frank, *Modern Documentation and Information Practices,* The Hague 1961. The handbook distinguishes two types of abstracts, one of them, the so-called *informative abstract*, belongs to the type of abstracts herein referred to as excerpts; they may, although they do not need to, contain a *critical*

[5] A new Polish version was published in the series of Wydawnictwo Czasopism Technicznych NOT, Warszawa 1965.

appreciation. The fact that an abstract prepared for documentary purposes does not need to be an image of a text, is supported i.a. by the following guideline: "In composing an abstract there is no need to always follow the same sequence as the original publication." And further: "The question of how far one should go into detail must depend on the object which the evaluation of the literature is intended to serve." The objective is to dedicate the abstract for this or that group of readers, which is illustrated by the example that different data are required by a head of an enterprise, compared to that of a design engineer and that of the engineer supervising production (cf. Frank 1961: 44-45).

The other type of abstracts, called *indicative abstracts*, does not fall within any of the types of abstracts described herein. This is rather a considerably abbreviated description of contents, informing the reader of the main topics of the text, using the form of lose terms not joined into sentences. It is of course a matter of agreement as to what extent we wish to extend the notion of the abstract and whether as a result of such an extension the notion will include *indicative abstracts*.[6] Since outside of the field of documentation one distinguishes between an abstract and a table of contents, there is a sufficient reason to adopt a slightly narrower notion of the abstract, omitting such lose strings of words. There is, however, a practical material relation between these lists of topics and the abstracts understood in the manner adopted herein; it is namely possible to use those lists as a preparatory material for an abstract, or the other way round; if one disposes of an abstract, one may use it to prepare this kind of list, which is more economical than preparing such lists on the basis of the original text.

As it follows from a comparison with yet other instructions, the documentary practice is quite uniform in various countries. The German (DDR) instructions list three methods of preparing abstracts and the application of

[6]There are also other kinds of statements which to a smaller or greater extent resemble abstracts. The title of the work may be considered sometimes to be the shortest abstract possible, and if we slightly develop this title, then the resemblance becomes even more visible. A set of a well selected and ordered extracts (quotations) from the text, arranged to constitute a certain intellectual whole, also has certain features of an abstract, resembling a selective excerpt. It is difficult to distinguish between an abstract and a report; the difference seems to be the length and a varying degree of interpretation, i.e. gradable features. Finally a translation of a text made with the use of either abbreviations, conventional abbreviations or synonymous expressions, which are shorter, shares with an abstract the feature that it renders the thought of the original text in a shorter form (it is different from a proper abstract in that in this case that the smaller capacity does not result in loss of information). By the way, use of abbreviations is a recommendable auxiliary operation used by each type of abstract.

one of them (the so-called *referierende Methode*) results in what in English is called the *informative abstract*, application of the second one (*descriptive Methode*) results in the *indicative abstract* and the application of the third one (*analytische Methode*) results in a product being a synthesis of the previous two (Koblitz 1964). These two basic forms of abstract are also stipulated in the Polish norm for documentary sheets, issued by the Polish Normalisation Committee under no. Pn-67/N-01176.

4.3. Types of abstracts and the character of the original text

As it follows from the present review, documentalists prefer one of the abovementioned four (distinguished as a result of the crossing) types of abstracts, namely the selective excerpt of commenting character. As the second possible form the documentalists recommend something which within the meaning adopted herein is no longer an abstract, i.e. a list of terms characterising the subject matter of the original text. It is understandable that documentalists prefer excerpts with the elements of a commentary or appreciation, if one takes into account the economical character of this form (cf. 2.2.2 and 2.2), and if one addresses the abstract to a specific reader, knowing his interests and need for this and no other type of appreciations. The negative features of these types of abstracts, such as the risk of subjectivity of the appreciations, are virtually eliminated, if the abstracts are prepared by competent persons, and if the vast majority thereof are abstracts from the field of science and technology.

In cases where the risk of subjectivism is greater, where the aptness of appreciations is a less verifiable feature, and where the recipient is in no need for appreciation, it is better to use a non-commenting maximally objective form of abstract. An example of such a situation may be a discussion from the field of social sciences (where valuations and assessments are inevitable), wherein it is necessary to carefully separate the presentation of the views of the interlocutor from one's own assessment of these views. A form maximally conductive for objectivism, wherein even the selection of topics is determined by the original text structure, and not by the point of view of the person preparing the abstract, is of course, what we have called here a text image.

As a means of an example of this form, recommendable in theoretical rather than practical activity and in humanities and in social sciences rather than in natural and technical sciences, the author presents below an abstract of this work, which is simultaneously of both technical and humanistic character, being a text image based on the table of contents preceding it.

TABLE OF CONTENTS

ABSTRACT

0.1. The issue of types of abstracts appears in the activity connected with provision and transformation of information contained in texts, for example in documentary, didactical and interpretational activity.

0.2. An abstract is a transformation of the original text resulting in considerable reduction of the length thereof, but retaining the ”principle ideas” of the original text. Abbreviation of the text by retention of the ”principles ideas” thereof may be effected in one of the following ways.

1.1. The operation of text image generation starts with the division of the contents thereof, whereby it is convenient to apply positional numeration (e.g. segment 1 is divided into 1.1. and 1.2., further 1.1. may be divided into

1.1.1. and 1.1.2., etc.). This provides, either immediately, or after certain additional transformations, a detailed and hierarchized list of questions, and answers to these questions, formulated in full indicative mood sentences, constituting the desired abstract. Omitting the further stages of such qualification, one obtains a more concise abstract, which may successively be made even more concise, by omitting further (from the end) levels of classification.

1.2. The above procedure contains the actions which may be described as an (set theory) operation of generating an image of a set in accordance with a certain relation. The projected set is a set of sentences of the original text, and the image thereof is a set of the elements of the table of contents (and in a broader sense, also the abstract itself), and the relation transforming one set into the other is the titling relationship, existing between each element of the table of contents and a certain segment (a sub-set of the set of sentences) of the original text. A geometrical interpretation may also be applied to these relations.

2.1. An abstract as a text image is generated by taking from the original text of the elements determined by the table of contents and by omitting the rest. If one makes the omissions on the basis of relevance appreciations (in accordance with the adopted point of view), there will be created another form of an abstract, called a subjective excerpt from the original text. The criteria here may either be quantitative or qualitative.

2.2. A quantitative criterion of relevance of a given topic is the frequency of appearance of certain terms in the text, potentially the density of their distribution (greater condensation indicates greater specificity of a term); a list of terms found with the use of this method determines the subject matter of the abstract. Application of the qualitative criterion consists i.a. in distinguishing the genres of the statements to be omitted, e.g. proofs of theorems, protocols, experiments, digressions, polemical fragments, etc.

3.1. Certain abstracts are characterised by the fact that they contain expressions not belonging to the language of the original, but to the metalanguage or the reported speech of the person preparing the abstract. An abstract constructed in this manner resembles a commentary to a certain extent, and therefore it has been called a commenting abstract.

3.2. Its advantage consists therein that it may provide information on the

original texts taken from outside the text itself, it is also possible to present therein a point of view determining the contents selection criterion and to present certain appreciations, as well as to refer to the recipient's knowledge. The semantic information theory may be helpful through closer determination of the relation between the supposed knowledge of the recipient and the information provided by the abstract.

3.3. In such cases there appear, however, problems characteristic for commentating, boiling down to the issue of objectivism. Commenting hypotheses are sometimes debatable, the language of the original language may be sometimes impossible to translate into the language of the commentator, moreover there is a risk of errors in the appreciations formulated (e.g. correctness of a certain proof).

4.1. The above description of the types of abstracts has been done on the basis of two division rules: contents selection criterion (structural or evaluative, "external") and the division into the intra-language (within the language of the original) and metalanguage character of the abstract. The crossing of these divisions provides us with four types of abstracts. There are also mixed-procedure abstracts, e.g. images of excerpts or excerpts from images, etc.

4.2. In documentary practice metalinguistically formulated selective excerpts are the most commonly used type of abstracts. These are the so-called informative abstracts. Apart from the latter, there also are abstracts constituting lists of topics, these do not belong however to abstracts within the meaning adopted herein.

4.3. Documentalists' preference of selective and commenting excerpts is explained by their economical form and the reduction of their defects, which are less threatening in case of very concise excerpts from the fields of natural and technical sciences. In cases, however, when the subject matter or the purpose of the abstract (being for example a polemic) bears the danger of subjectivism, text images, reflecting the structure of the text without a valuating selection, are more desirable.

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