

## HUMAN TRANSLATION AND TRANSLATION BY MACHINE

### II

by

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### I

#### TRANSLATION AND THE STRUCTURE OF SIGNIFICATION

THE assumption that words have meaning and that their meaning is determinate, relatively constant, and, therefore, also analysable, is indispensable for translation, because it is indispensable for every kind of linguistic activity - except perhaps that esoteric form of poetry that is intended to stimulate rather than to communicate. Wherever words are used for the purpose of communication they have to "convey" something from one person to another, and this something must not be changed by or during the process.

The relation between a word and the thing it "conveys" is the semantic relation which, under all circumstances, is established by agreement and mostly becomes a convention.

I have put "convey" in quotation marks in order to indicate that the term is here used metaphorically. Words do not actually pass things from one person to another, but give instructions concerning the operations that are required to re-construct the particular things that constitute their meaning. Expressed in its simplest terms, verbal communication between X and Y, therefore, consists of the following steps:

- (1) X carries out a sequence of operations which results in a certain thing N;
- (2) X presents to Y the word W which, owing to an established semantic relation, indicates the operational result N (N is the nomination of W);

- (3) Y carries out the operations indicated by the word W and thus re-constructs the result N,

From the operational point of view everything is considered the result of operations. Hence, for the purpose of re-construction involved in communication it is irrelevant whether words are considered to indicate the thing N or the sequence of operations resulting in the thing N - because, to describe N, one must in any case specify the operations of which N is considered to be the result.

If a thing N has been given a name, that is, if one has agreed to link it by means of a semantic relation to a word W, then N is the nominatum of W, and the question as to the meaning of W can, now, be put more explicitly, how does one have to operate in order to obtain the nominatum of W?

The analyses carried out by the Centro di Cibernetica in Italian, English, German, Russian, and other languages, have confirmed us in the conviction that the operations by means of which human beings construct the nominata of words are always of the same few kinds, regardless of the language that is to be used. These operations are: Differentiation, Figuration, Categorisation, and Correlation.

The signification of a linguistic expression (word or sentence) is always made up of results of these four operations, taken singly or in combination, and we can draw up a general pattern for their possible distribution in the significations of linguistic expressions:

The signification of a single word may be:

- (A) a single differentiation, figure, or category (simple nominatum),
- (B) a combination of these (composite nominatum).
- (C) a correlation or a correlational net (i.e. a combination of nominata that may themselves be simple or composite);

The signification of a sentence is always:

- (D) a correlation or a correlational net.

If one gets down to analysing the signification of individual words in terms of their operational content, one realises that any preconceived ideas one had about meaning have to be adapted in one way or another. For the meaning of words is neither so elusive as the romantics would have us believe who meet every attempt of precise definition with the objection: "But language is a living thing!", nor is it quite so simple and self-evident as some logicians would like it to be who glibly substitute letters for words and equations they are trying to formulate.

The vocabulary of a natural language, in fact, contains comparatively few words of type A; that is, words whose signification, regardless of their occurrence in or out of context, is a single differentiation, figure, or category.

The majority of words are of type B; that is, words whose nominata are composites. They are no less definable, but necessarily as a combination of operational elements. And because their nominata are composites they sometimes function in different ways according to the context in which they occur. This does not mean that their nominata change - it only means that in certain contexts some of their elements are operative while others remain irrelevant for the overall signification of the expression. (e.g. if we assume that the nominatum of the word "fresh" is a combination of various elements including an element of temperature and one of newness, we find that in an expression where "fresh" refers to eggs, the 'newness' and not the 'temperature element' is relevant; while in an expression where "fresh" refers to "wind" it is the other way round.)

In some way this is like what happens with the coloured building-blocks that children play with. There are cubes whose sides are of different colours; each of these cubes can be described in terms of the colours of its sides; but placed in a composition of several cubes some of its sides are necessarily hidden and their colours, thus, become irrelevant in the colour scheme of the composition. This simile is, of course, a trifle too simple. The elements of meaning making up the signification of a word are not so directly related with each other as are the sides of a cube; and the accentuation or suppression of a facet of one nominatum by the contextual presence of a particular facet of another nominatum is not just a question of spatial proximity.

The interplay of operational elements pertaining to different nominata is certainly one of the most complicated aspects of semantics. The detailed analyses that have to be carried out in order to establish something like a comprehensive pattern for a whole language are a matter, not of a few months, but of many years of co-ordinated team-work. The result of such an undertaking would be the first operational dictionary; that is, a dictionary that does not - like the existing ones - define words by a circle of references including a greater or smaller number of other words, but by giving the actual operational composition of the respective nominata as well as the various functions its elements may perform in different contexts. At present we have only just begun to realise the vastness of the analytical work that has to be done before even a first tentative edition of an operational dictionary could appear (for an example of such analyses cf. "Operational Semantics" GRISA Report, Euratom, Bruxelles).

That operational dictionaries of the input and the output languages are

an absolute necessity for mechanical translation has become clear in the course of the analyses we have recently carried out in various languages. We have found that the operations by means of which human beings construct the nominata of their words are always the same, but we have also found that it is rare for two words of different natural languages to have the same nominatum. Put in more generic terms, this means: the operations that supply the contents of the continuous, not yet articulated stream of thought are the same in every human being; but its articulation (i.e. the way in which the operational results making up this stream of thought are then grouped in order to become the nominata of words) varies considerably from one natural language to another.

On the level of A (words with simple nominata) there are comparatively few discrepancies between natural languages; where they occur, they spring from the fact that not all single results of differentiation, figuration, and categorisation that are individually designated by one language have been individually semanticised in all other languages.

e.g. English: cold cool tepid warm hot  
Italian: freddo - tiepido - caldo

(Note: "cool" can often be translated by the Italian "fresco" which, however, does not designate a simple differentiatum of temperature, but contains also other elements, as does the English "fresh".)

On the level of B (words with composite nominata) there are very many discrepancies; they spring from the fact that the particular combination of operational elements forming the nominatum of a word of one language has not been semanticised in another language.

e.g. English: to come to go  
Russian: idti

(Note: the nominata of the English verbs contain change of place plus the direction relative to a particular location; the nominatum of the Russian verb contains no direction.)

e.g. German: oben hinauf herauf  
English: up

(Note: German combines the mental category either with an element of its construction or with a direction relative to a particular location; English has semanticised the category by itself).

On the level of C (words with correlated nominata, non-existent in English) there are two kinds of discrepancy:

- (a) springing from the fact that a combination of operational results expressed by one word in one language may require several words in another language.

e.g. Italian:      andro                      dategliela  
         English:    I shall go                      give her to him

(Note: in the first case there are two discrepancies; one owing to the fact that the personal pronoun can be left out in Italian, since it is sufficiently designated by the personal form on the verb; the other owing to the fact that Italian combines the "future" - element with the nominatum of the verb before semanticisation, whereas English effects this combination by means of a correlation. )

- (b) springing from the fact that the correlated operational elements may themselves be composites and, thus, subject to discrepancies of type B (so far, however, I have not found instances of this kind).

On the level of D there are three kinds of discrepancy:

- (a) since the correlating element (correlator) is the result of mental categorisation, and since not all single results of categorisation have been semanticised in all languages, we find discrepancies of type A.

e.g. English:    I come from the baker's; I go to the baker's  
         Italian:    vengo dal panettiere    ;    vado dal panettiere

(Note: English obliges us to use different correlators to link a specific location with the first or the second place in a change of places; Italian, in some cases, does not.

- (b) since a correlation is a combination of elements which may themselves be composites, we find discrepancies of type B.
- (c) since correlator expressions have their individual rules of application (i.e. cannot always correlate all kinds of operational elements or composites) we find that different languages sometimes have to use different correlator expressions in order to express

the same total of operational elements.

e.g. Italian:	macchina da cucire	automobile da corsa	)
			)
English:	sewing-machine	racing car	)
			)
		cavallo da corsa	)
			)
		racehorse	)

(Note: Italian links the two composites in all three instances by means of the category indicated by "da"; English uses different correlators (an explicit and an implicit one) in the first two instances, and, in the third, combines the operational composites previous to semanticisation, thus avoiding correlation.)

Considering this copious list of possible discrepancies between natural languages, one might be tempted to ask how anyone could ever produce something worthy of the name of translation. Indeed, if we maintained the notion that translation is the immediate substitution of words of one language for the words of another, we should have to conclude that translation is impossible. Yet, at this very moment, thousands of translators are busily working away, and what they produce is often perfectly satisfactory. How is this possible?

The answer, I think, becomes clear, if we remember what we have said about communication. Translation, in fact, doubles the process of communication from the author to the translator and communication from the translator to the reader (or listener). Applying the three-step-pattern I set out at the beginning, we now get the following succession of steps:

- (1) X carries out a sequence of operations constituting the train of thought T, and, with a view to communication, articulates T into the nominata  $NN_1$ ;
- (2) X presents to Y (the translator) the words  $WW_1$  which, owing to established semantic relations, designate the nominata  $NN_1$  in language 1;
- (3) Y carries out the operations indicated by the words  $WW_1$  as constitutive of the nominata  $NN_1$  and thus re-constructs the train of thought T which, with a view to communication in language 2, he articulates into the nominata  $NN_2$ ;
- (4) Y presents to Z the words  $WW_2$  which, owing to established semantic relations, designate  $NN_2$  in language 2;

- (5) Z carries out the operations indicated by the words  $WW_2$  as constitutive of  $NN_2$  and thus re-constructs T.

Although the process of communication has been doubled, we have only five steps, because step 3 of the translation process comprises both the third step of the first communication process and the first step of the second communication process. And it is here that we find the answer to our question: the translator - like any receiver of a linguistic communication - re-constructs the original train of thought by obeying the semantic relations of the input text; that is, by carrying out the operations that constitute the nominata of the input words; and as he necessarily carries out these operations one by one, they also constitute a continuous stream of operating (namely, the stream of thought T) whose operational elements can at once be re-grouped, or articulated, to form the nominata of another language.

Thus a translator who is equally accustomed to articulating his trains of thought so as to form nominata of either one of two languages, may even remain quite unaware of the discrepancies between them, because he never steps directly from a nominatum of language 1 to a nominatum of language 2, but always and necessarily passes through the stage of continuous operating in which the first articulation is given up before the second is reached.

At this point it should be clear that neither words nor the often very complex operational constructs linked to them by a semantic relation can be taken as basic units in a translation procedure that is to yield results comparable to those produced by human translators. On the one hand, the discrepancies we have indicated would lead to a most unsatisfactory distortion of meaning, on the other, the apparent gain in simplicity of procedure would be more than invalidated by the fact that the resulting scheme could find no application whatever beyond the strictly limited sphere of the two languages for which it was evolved. If, instead, the kind of operational analysis we suggested is carried far enough to isolate the very elements responsible for the discrepancies in the meaning of words we reach a level on which we can successfully avoid distortions of meaning in the translating procedure; besides, the results of the analytical work we have to accomplish for one language with a view to translation into a particular other one will be applicable, immediately and without alteration, in the procedures of translation into all other languages.

However, even if we assume that the translating machine has been supplied with complete operational dictionaries for the languages it is to work in, its functioning still remains different, in at least one important respect, from that of a human translator. In the course of the third step of the procedure the translator, as we have seen, "*carries*

out the operations indicated by the words as constitutive of their nominata, and thus *re-constructs* the train of thought ..."; yet, at least for the time being, we have no machine capable of carrying out all the operations that words indicate as constitutive of their nominata. Although we may assert that a computer carries out the operations indicated by sentences of the special kind "five plus seven is twelve", we cannot say the same in the case of a sentence like "John and Mary are getting married". Given an operational dictionary, the translating machine can compile all the operational results indicated by this linguistic expression, but it cannot carry out the operations that produce them, and that is to say, it cannot re-construct the stream of operating, the train of thought.

This technical difference between human and mechanical translator obliges us to make a further distinction between the process of communication and that of translation. We have said at the beginning that it is irrelevant whether words are considered to indicate the operational result N or the sequence of operations resulting in N, but this is true only for a process involving but one language. Because in this case the receiver of the communication can be expected to supplement as a matter of course (and mostly quite unconsciously) the operational indications of the linguistic expression with those elements which the author - relying on a justifiedly presupposed similarity between the receiver's habitual ways of thinking and his own - has not bothered to include in his formulation. That is to say, while we stay within the realm of one language we can make use of a general fund of experience and knowledge common to all speakers of that language. In the case of translation, however, this is not necessarily so, because the common background knowledge (notional sphere) of one language group is by no means identical, or even equivalent, with that of another. The human translator, being familiar with the notional spheres of both languages, has no difficulty in adjusting his output in such a way that it contains as explicit elements all those items which are notional matters of course in the language of the input but not in that of the output. But the machine can work exclusively with the operational elements explicitly indicated by the input text. Such elements as the human translator adds to the output on the strength of the general knowledge he possesses independently of and previous to any input would, therefore, be missing in the machine's output - unless we incorporate into the machine all these generally known and therefore not explicitly formulated elements by means of a network of classifications. But this is already the subject of Dr. Zonta's contribution in which you will find the complete hierarchy of classifications necessary for the mechanisation of linguistic activities. In the present context I should like to stress only the essential similarity of the analyses required for the compilation of the operational dictionary and for the classifications of the notional sphere: both are analyses that individuate operational elements contained in the stream of operating we call thought; but whereas the first concern



the operational elements that go to make up the nominata of words, the second concern particular relations between the nominata and are, as a rule, not indicated by words.

There will always be some cases, especially when translating from languages which in some respect are richer than others, where neither of our methods of analysis will enable the machine to re-construct the original train of thought completely, for the simple reason that the output language has no means for the expression either explicit or implicit of certain operational elements expressed in the input text. But this should not be regarded as a shortcoming of the machine; in these cases the human translator, too, is at a loss; and it would hardly be fair, at this stage, to expect the machine to do better than we do.

**COMPLETION OF INCOMPLETE RUSSIAN CORRELATIONAL NETS**

THE translation from the Russian language raises a question which in most other languages would be superfluous: the recognition and filling out of ellipsis in speech. Ellipsis can be defined for our purposes as the omission of parts of speech which can be recognised without being nominated. In many cases ellipsis is a poetic means of expressing emotion and emphasis, when the speaker adds, to a situation already known, a new aspect or his own or somebody else's attitude. This kind of ellipsis I shall not discuss here, because it requires the recapitulation and summarising of a wider context, which has not been studied for our current machine translation project, moreover the memory of the machines which works by registrations is physically inadequate for this work. The thema I am concerned with in this paper is the type of ellipsis permissible in narrative and scientific prose. Here the things not nominated may also be recognisable from the situation already known, but the language norm requires a certain degree of explicitness which must satisfy some basic rules; and for this reason ellipsis can be recognised fairly easily.

Our machine translation project deals with a sentence-by-sentence translation, and, at present, we have not studied the possibility of employing information from a larger context. Therefore the machine is in the situation of a man who has to translate isolated sentences. There is in consequence some uncertainty in any case where pronominal expressions are to be translated. Here we must limit the explication of pronominal expressions to the information given in the same sentence. By pronominal expression we mean any kind of expression which requires completion by information taken from somewhere else.

The explicitness of expression required by the language norm can be reduced to two principles:

1. A sentence (proposition) must contain a correlation "subject-development". I think that this requirement does not contradict the definition of the proposition which can be found in traditional grammar which at least requires "predicativity" as a necessary constituent.
2. If, in the course of the discourse, one has expressed a modality of construction (see report of S.Ceccato Paper 30), one must also express what it is that has been constructed with this modality. If the speaker does not, the reader must complete this lacuna as far as possible. For the sake of comprehensibility

the speaker (or writer) will use ellipsis only in the case where satisfactory completion is possible. The machine which in mechanical translation is the reader can only explore one single proposition and complete the ellipsis from information which can be found there.

We must study the possibility of recognising ellipsis in the procedure of the construction of the correlational net, because that is the only stage where they can be caught. The linguist's first task is to find out all the possible modalities of construction within the language and the means of expressing them. In practice, setting out from the language, one tries to individuate the different modalities of construction from the linguistic expression.


When one has individuated them all (for a limited dictionary or the entire language), one studies the things which can be constructed with each modality. The result of this work is a complete list of modalities of construction and the conditions which determine the things constructed with a certain modality. Every word used in the dictionary of our MT project is assigned an indication as to whether it expresses a modality of construction, whether one part of it contains a modality or not.

For the sake of clarity I must give here two definitions which are employed in our MT project.

1. A sentence is a sequence of words between two full stops (. ! ?).
2. A word is a sequence of letters between two spaces.

The modalities of construction one can divide into two classes:

1. The way in which one takes a thing (modalities of take-up), for example: the house, shall go, rather good etc.
2. The way in which one passes from one thing to another e.g.: and, or, in etc. (modalities of passing).

In order to maintain the homogeneity of the procedure we have decided to treat both kinds of modalities in the same way maintaining the structure of the correlating elements and correlata and the figurative representation of the correlations by the rectangles . Therefore we consider the modalities of take-up as correlata and the fact that they are modalities as one correlating element. Thus any modality of take-up will appear in the figurative

representation as  or 

The modalities of passing may be expressed by single words (and, or, in, or etc.) or connected with one of the correlata (father's, my, well etc.) They can be also expressed by the agreement of the form of the words (he goes) or the simple neighbourhood (chrome yellow).

The correlational value of a word or product can be:

1. 000 i.e. the word does not contain a correlating element
2. The word is correlating element (correlational function 3).
3. The word contains the correlating element and the first correlatum (correlational function 4)
4. The word contains the correlating element and the second correlatum (correlational function 5).

NB. If a word does not contain a correlating element, it can also be represented by the fact that it will become first or second correlatum of a correlation not yet determined and attribute to it the correlational function 1 and 2.

The principles of combination are these:

1. One can combine two words or products if there is at least one modality of construction (correlating element) and at least one cell of the rectangle is free.
2. The combination is accepted, if
  - (a) The word or product which fills the free position satisfies the conditions given in the correlational control matrix.
  - (b) If there are two modalities of construction which both require the same thing for the vacant position. e.g. Italian "il rosso" where the article "il" and the adjective "rosso" require as correlatum a noun in the singular, masculine.

In this way the machine opens, for every modality of construction a rectangle which later, in the course of the construction of the correlational net, will either be closed or not. If, at the end of the construction and the control, some rectangles remain open, the machine has to fill them in some way. In our Italian example "il rosso" the thing to be inserted is a masculine noun in singular. At this point one can study whether the specific output language does permit a certain kind of ellipsis or not. English,

for instance, does not in our example, and one should translate it by "the red one" inserting a pronoun.

In Russian this kind of ellipsis must satisfy certain conditions:

1. The alternative between a thing with a modality of construction and a thing without excludes the ellipsis. e.g. The Russian word "рабочий" which may be either noun or adjective cannot be used as adjective if it is not connected with a noun "рабочий день"
2. At least one of the things constructed with a modality of passing must be expressed. A modality of passing which stands in isolation is considered a semantic object and treated as noun, e.g. "In and or are modalities of passing".

Things omitted in this way can be recognised either from a wider context, and here the machine cannot deal with the, or from what is said in the same sentence. Here we can give fairly precise criteria for the completion.

1. In the course of the construction one attributes to the thing omitted all the indications required by the correlational control matrix.
2. At the end of the construction one has obtained a more or less precise representation of the thing, and in certain cases one can insert a word which has been individuated by statistical studies.

*Example:* If we take the Russian sentence "Мне бы теперь домой"

Word 1: Dative singular of the personal pronoun. The dative can be either correlating element or not.

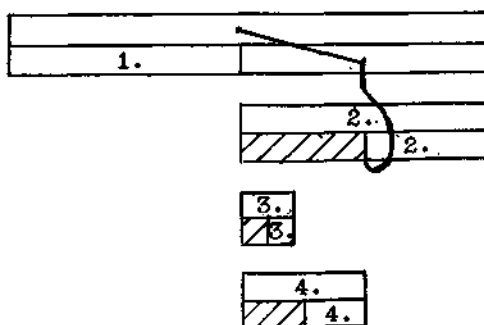
Word 2: Modality of take-up. Correlational function 5. The first correlatum must be either a verb in infinitive or a verb in the personal form of past tense. The product is the conditional mood of the verb.

Word 3: Adverb of time. Correlational form 5. The first correlatum must be a verb.

Word 4: Adverb of direction. Correlational function 5. The first correlatum must be either a verb or a noun containing motion.

1. One can correlate a noun or pronoun in dative with an infinitive of a verb plus "бы" and obtains the correlation "subject-development" in conditional mood plus a modality of obligation

2. One can correlate a verb with an adverb, and by the correlation with word 4 one adds the information that the verb is a verb of motion. The final correlational net is this:



Statistically we know that a verb of motion in such a structure is usually "идти" (to go) So the English translation of the Russian sentence would be: "I should go home now".

In this way one can complete elliptic expressions more or less exactly in every case where a correlation has been opened but not closed. The only case where this procedure does not work, is that in which the personal form of the verb which is considered correlating element in the correlation "subject-development" has been omitted and there is no correlation which requires a verb. This situation can be resolved by way of the requirement of the correlation "subject-development" in the sentence.

*Example:*

Мой друг из Москвы

One can very well construct a correlational net without inserting anything, as one would, for example in the title of a book, and one could translate it into English by "My friend from Moscow". But in a normal text one expects the correlation "subject development", and the literary norm of the Russian language permits this kind of ellipsis only if the verb "быть" has been left out. Further the verb must be in the personal form of present tense.

The verb "быть" is the most often omitted in the Russian Language. Therefore one will insert it first and replace it only in the case where it is not possible to construct a correlational net with it. There are some other verbs, which are omitted rather often, for example, "бить, говорить, идти" and some others. Of course one can omit any verb

and any word, if one has named it before and leaves a correlation open in the sentence, e.g. "My friend got into the car. I too".

Handicapped by the limits which are set by our machine translation project and cannot be enlarged without serious difficulties, we can resolve the problem of completing elliptic expressions with a precision determined by the amount of information required from a larger context than a sentence. The completion is perfect, if no information from outside the sentence is required, and the more information one must search for in other sentences the less perfect will be the completion. An improvement can be made in two ways: Either one enlarges the unit of translation, i.e. one translates two or three sentences at once, and this resolves the problem only in part, because it will remain impossible to use information from a larger context than the unit chosen, or one adds to the machine translation the procedure of automatic summarising which should permit the use of all information necessary from a larger context.

**SOME ANALYSES OF DEVELOPMENTAL SITUATIONS  
IN POLISH WITH A VIEW TO FINDING ADEQUATE ENGLISH EQUIVALENTS**

WE have introduced a study of Polish verbs because in spite of its close structural resemblance to Russian the Polish language displays interesting discrepancies in signification.

x x x x

Analysing Russian verbs with a view to English translation we have seen that we generally obtain several English equivalents for each verb since the Russian verbs in themselves give us little information on account of their very large content. In Russian it is possible to use the same verb in quite different situations - and that is why difficulties arise when an equivalent has to be chosen in another language. While making analyses of Russian verbs we made comparisons with another Slav language, Polish; and we were surprised by the fact that the Polish way of constructing and expressing relations is nearer in many cases to the Western-European languages than to the Russian.

This can be explained by certain factors in the early history of this language. It first appears in the 10th century and, although deriving from the old Slavonic of the Russian Orthodox Church, developed mostly under Western-European influences. The first favourable opportunity for the penetration of these influences was the adoption of the Catholic religion and with it of the Latin alphabet. The Catholic church with its Latin language had an enormous importance in the development of the Polish people. Thanks to the common alphabet contact with other Western cultures became also easy, for example with Germany, France and Italy by which Poland was strongly influenced at different periods and for different political and social reasons.

All these influences affected not only the formation of many words but also the way of thinking of which the language is the expression. The first - even if not very important - differences between the Russian and Polish verbs are seen in analysis of the verb "быть", Polish. "być", English "to be".

The Polish "być" derives directly from the Slavonic "быть" and maintains the irregular stem (есмь - jestem) for the formation of the present tense. Unlike Russian which never uses this tense (except - and also seldom - for the third person) Polish regularly employs it in the same sense as the English present tense of "to be". This verb expresses the meanings



"to be" and "to exist" and fulfils its auxiliary functions, but it can never be used, as the Russian can, with the signification of "to have". In the Russian example: "у него была сестра" the verb has to be translated by the Polish verb "mieć", equivalent of the English "to have".

Taking other verbs we shall see that the discrepancies become more marked.

The Russian verb "писать" designates the creative activity of semantically expressing thoughts, ideas or feelings and in this it corresponds to the Polish and English conceptions: "он пишет книгу" "on pisze książkę" - he writes a book". It can also express an activity of recording conventional signs (letters, numbers, musical notes etc.); "он пишет диктовку" - "on pisze dyktando" - "he writes a dictation".

But the Russian concept is wider than the Polish or English ones because it does not consider only the use of conventional semantic relations, but any human activity involving the leaving of traces on a surface (except sculpture). *Example:* "он пишет красками" whose word-for-word translation would be "he writes with colours" - English "he paints". In this case Polish cannot use the verb "pisać" (write) either; it employs the verb "malować", formed from the German "malen".

In another example we shall see that the content of the Russian verb is even wider. For "он пишет картину" we cannot translate "he is writing a picture", nor, in Polish, "on pisze obraz". The Russian sees in this situation only the fact of creation and the result of it, the picture; it does not feel the necessity of mentioning the means of expression. For translation into English or Polish this is not sufficient, the situation remains ambiguous for it could mean either "he is drawing a picture (on rysuje obraz) or "he is painting a picture" ("on maluje obraz") and if there are no other elements giving further information we remain in doubt as to how to translate the sentence into Polish or into English.

The Russian verb "перебить" indicates in the most generic way the activity of breaking some continuity, including even - when the object is a plurality - the concept of beating and killing. The broken continuity can be of different kinds and in the examples below we see that Polish and English equivalents both change according to the object to which the activity refers:

1. "перебить речь" ; przerwać mowę; to interrupt a speech.  
The Polish "przerwać" expresses interruption of a continuity of some activity, as well as the English "to interrupt".

2. перебить кому-нибудь ногу; złamać komuś nogę; to break somebody's leg.

Here we have a similar concept of activity but in relation to an object and therefore the verb in Polish is "złamać", in English "to break".

3. перебить подушку ; wstrząsnąć poduszkę; to shake up a cushion. The Polish "wstrząsnąć" designates the activity of bringing into motion and in consequence into a changed position the elements or particles of a whole - the English "to shake up". In the example of the cushion it is the movement which has as result the change of position of the feathers inside.

We find further examples where the object is a plurality:

4. дворник перебил котят; dozorca pozabijał kocięta;

the yard-keeper killed the kittens.

5. дворник перебил ребят dozorca pobił dzieci;

the yard-keeper beat the children.

6. неприятель перебил ребят nieprzyjaciel pozabijał dzieci;

the enemy killed the children.

The first two examples have the same subject and verb and the object in both cases is a plurality of living beings - in the first case of animals - in the second of children. If in the sentences which precede or follow we have no other information, we can base our decision only on the notional sphere of the word "yard-keeper" and on our personal valuation of probability. As it seems plausible that yard-keepers might often kill new-born kittens - there is little doubt that the verb used in the above sentence means "to kill". As for the second example, it seems quite impossible that a yard-keeper would kill children (and even if he did it would certainly be said in some way which showed the valuation of the fact) and we understand that the verb here means "to beat". Still more difficult for translation is the third example - "

[absent in original]

If we find this sentence among other descriptions of war horrors we should be inclined to translate it by the verb "to kill", but if we have no other information about the "enemy" in question and we want to avoid errors we have to make two equivalent sentences in Polish and also in English: "nieprzyjaciel pobił dzieci"; "the enemy beat the children:

"nieprzyjaciel pozabijał dzieci"; "the enemy killed the children"; because in neither of these languages we have a verb of such a large generic content.

The Russian verb "считать" can indicate the activity of establishing an amount or quantity by means of counting or calculating, the activity of counting in itself, and the drawing conclusions from previous deliberations:

1. считать деньги ; liczyć pieniądze; to count money;
2. считать до пяти; liczyć do pięciu; to count up to five;
3. вор считал на отсутствие хозяина ; złodziej liczył na nieobecność właściciela; the thief counted on the absence of the proprietor;
4. мы считаем на него; my liczymy na niego; we count on him.

In all these cases where the mental activity is a calculation either of numbers or of factors which have to be taken into consideration before arriving at a conclusion - Polish and English have an exact equivalent for the Russian "считать", namely "liczyć", "to count".

But let us look at other examples:

5. Пушкин считал драму высочайшей формой искусства  
Puszkın uwazał dramat za najwyzszą formę sztuki.  
Pushkin considered the drama the highest form of art.
6. Не считает даже за нужное отвечать  
Nie uważa nawet za potrzebne odpowiedzieć;  
He does not even consider it necessary to reply.
7. Считаю, что он прав  
uwązam, że on ma rację;  
I consider that he is right.

Here the mental activity is no longer a simple collecting of factors and summing them up for valuation. The conclusion is the result of a more complicated mental process and therefore Polish uses the verb "uważać" equivalent to English "to consider".

The Russian verb "достать" expresses the activity of establishing contact with an object and the result the taking possession of it. It is

presumed that there is some effort to be made before obtaining the result: the object may be situated at some distance, or hidden away, or not easily available.

1. Наконец он достал свои деньги  
on nareszcie wy dostał swoje pieniądze; at last he obtained his money;
2. достать книгу из шкафа  
wziąć książkę z szafy; take the book from the book-case (or fetch the book from the bookcase).

We see from the example (1): when on the way to the result there is some difficulty of unspecified kind, Polish designates it by the prefix "wy" added to the verb "dostać" which expresses the activity of taking possession. The English in this case remains rather generic, and the idea of difficulty is given not by the verb but by an adverb or by some other means.

When the only difficulty in taking possession is the distance of the object from the subject (*example 2*), the English translation "to fetch" is the nearest one, but it is not always possible, because it contains the idea of motion of the whole body, not only of a part of it. Therefore, if the motion is not specified by the Russian text it has to be translated by the Polish "wziąć" and English "to take" which express only the establishing of contact and appurtenance.

Another possibility of indicating the distance would be the use of the Polish verb "sięgać" the English "to reach", but these differ from the Russian "достать" inasmuch as they do not express the taking of possession. They indicate only extension in space. By adding a preposition - Polish "po", English "for" - we get the sense of finality: "on sięgnął po książkę" - "he reached for the book". And here is the difference between "he reached for the book" and "he took the book" - which is the right translation for the Russian "он достал книгу из шкафа"

The verbs "sięgać" and "to reach" correspond to the Russian "достать" when this indicates only extension with a determinate limit localised in space:

1. этот мальчик достает до моего плеча  
ten chłopiec sięga do mojego ramienia; this boy reaches my shoulder;
2. Здесь весло не достает дна озера  
tutaj wiosło nie sięga dna jeziora; here the oar doesn't reach the bottom of the lake;

But when the Russian `достать` used impersonally expresses extension limited by time or a finality, Polish and English require another verb because "to reach" does not allow of that kind of "contact".

3. `Муки нам достанет до весны`  
`wystarczy nam maki do wiosny;`  
the flour will be sufficient until spring;
4. `Не доставало денег, чтобы купить билет`  
`nie wystarczyło pieniędzy, żeby kupić bilet;` the money was not sufficient to buy the ticket;

When the Russian verb "`достать`" is used impersonally with a negation and there is no other information it expresses only the idea of lack:

5. `Ему не достаёт денег`  
`jemu brakuje pieniędzy;` he lacks money

And also in this case Polish and English use the same verb: Polish "`brakować`" - English "to lack". -

x x x x

The above analyses of developmental situations demonstrate the discrepancies between Polish and Russian and also show that Polish in this respect is more closely related to Western-European languages.