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AN ORDERED-TRIPLE THEORY OF LANGUAGE

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Chapter One

INTRODUCTORY

It has long been recognized by the members of the Prague School that a natural language should be examined not as a static, but as a dynamic phenomenon, as a system of systems in operation (cf. J. Vachek 1958.94—5), in short that it should be approached from the functional point of view. Investigating language not as an isolated phenomenon of the objective reality, but as a means of interhuman communication about the objective and/or subjective world, they have always endeavoured to pay due regard both to the so-called extralingual reality which is being communicated about and to the language user performing the communication. Following this tradition, we should like to present a theoretical framework of a natural language, taking into account all the basic components of any semiotic system and thereby preserving the link between the language user and the actual world on the one hand and that between language and its user on the other. The most suitable starting point for our attempt seems to be the Morrisian approach to the investigation of language as recently offered by Montague:[1] "The study of language... was partitioned in Morris... into three branches — syntax, semantics, and pragmatics — that may be characterized roughly as follows. **Syntax** is concerned solely with relations between linguistic expressions; **semantics** with relations between expressions and the objects to which they refer; and **pragmatics** with relations among expressions, the objects to which they refer and the users or contexts of use of the expressions." (1968.102). In spite of the fact that this approach has long been known and recognized, most language theories have simply disregarded one or sometimes even two of the basic components of language, dealing only with syntax and semantics, or with syntax alone. In other cases, semantic and pragmatic phenomena have been investigated under the heading of semantics without any clear distinction between them.

[1] R. Montague's wording of the Morrisian approach is employed here since it is regarded as more suitable for the present purpose than any of the original statements made by Ch. Morris (1938).

For example, Chomsky and Miller (1963.283) consider "a *language L to be a set* (*finite or infinite*) *of sentences*, each finite in length and constructed by concatenation out of a finite set of elements." According to these authors, it is further possible to say that a language is a free semigroup (a monoid) where the empty sequence (sentence) plays the role of a unique identity element and the set is closed under an associative law of composition (1963.274). We do not want to say that the definition is wrong or that it lacks exactness, we should only like to state that in its consequences it restricts the theory of language which is based on it. The undoubtedly correct statement that language is a set of elements (sentences), a monoid, says very little about the internal structure of this set, the relations that may occur in it, etc. In other words our objection is that what has been defined as a monoid should be regarded as a more complex formation. If we take into account not only the definition, but the whole Chomskyan theory, we can learn more about the internal structure of sentences, but this structure is either a purely syntactic phenomenon or something that is presented as semantics, but—in fact—appears to be a mere derivative of the syntactic structure. Further problems, concerning the so-called topic-comment sequence or the phenomenon of focus, seem to stand outside the scope of the "standard theory", and the attempts to accommodate all these phenomena are rather artificial and little intuitive in their final effect.[2] From the point of view of the link between language and the actual world, which seems to be a necessary precondition for regarding language as a means of interhuman communication, the conception of Apresjan, Mel'čuk and Žolkovskij[3] appears to yield a more liable basis on which to build up a language theory. It approaches language from the semantic angle, giving an equal status to both syntax and semantics. What we are missing there, however, is the pragmatic aspect of the matter that should be dealt with as an equal partner of the other two components.

Research into the theory of functional sentence perspective (FSP), or the organization of utterance, has led J. Firbas, F. Daneš and some other Prague School linguists to the conclusion that there is, apart from syntax and semantics, a third sphere of language, represented by FSP.[4] In spite of the fact that the term 'pragmatic' is not employed in this connection, it follows from the description of this sphere that it reveals the features of Morrisian pragmatics. The reason why it is not so called would seem to be that FSP does not exhaust the whole sphere of pragmatics. In any case, the theory of FSP presented as a self-contained system of language has been a decisive step forward on the way from the traditional investigation and re-investigation of syntax and semantics to a conception that considers all the three Morrisian components of language in one theoretical framework and is based on one definition of language. In the present paper we shall attempt to build up one such framework and to give a tentative definition of language, taking into account all the three components of a natural language as well as their internal structure. This attempt is the partial result of a series of discussions between a logician (Pavel Materna) and two linguists (Karel Pala and Aleš Svoboda) and may,

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[2] This can especially be seen in N. Chomsky (1968).

[3] See Apresjan (1967), Žolkovskij—Mel'čuk (1969).

[4] This idea was systematically developed in J. Firbas (1959a), (1959b), (1961), (1964b) and was expressed most clearly by F. Daneš (1964).

therefore, be looked upon as an attempt at a logico-linguistic conception of language.[5] We are speaking about the partial result, for our present contribution should approximately cover the first stage of the following preliminary plan of discussions: (i) building up a theoretical basis, delimiting the basic concepts, preparing the necessary methodological apparatus, construing a static model of language, and showing what parts deserve special attention; (ii) elaborating the static model, carrying out the necessary classifications or adapting the existing ones to suit our purpose, and attempting to formulate a dynamic model; (iii) drawing practical conclusions from (i) and (ii), verifying some parts of our model by the computer, and attempting to simulate the communicative process in it. From the linguistic point of view, the whole plan has been conceived in such a way as to permit our making full use of the positive achievements of the previous research, both traditional and generative.

As has been already stated, the core of our present contribution is a report on the initial phase of our discussions about the theoretical basis, which should enable us to proceed to the second stage of the research and to elaborate the proposed static model of language. The starting point of our conception is the assumption (based on regarding a natural language as a Morrisian semiotic system) that expressions of a natural language consist of the following three components: the syntactic, the semantic and the pragmatic. On the grounds of this assumption we regard expressions of a natural language (for short, language expressions) as **ordered triples** of the above components:

$$\langle \textit{semantic component}, E, \textit{pragmatic component} \rangle$$

In our conception, the syntactic component *E* is any such part of a language expression as is represented by the formal notation of the given expression in the written code of the respective language. What we have in mind here is the formal picture of an expression (i.e., the arrangement of letters, spaces and punctuation), which is to be further termed a **formal expression** ***E*** (of a natural language). (Not to be confused with "expression of a natural language" or "language expression", which contains *E* as one of its components!) The formal expression *E* is to be regarded as a type, and not as a token. As will be shown later on, we shall have to deal with formal pictures of words, phrases, clauses (sentences), or even higher structures. At the present stage we have restricted *E* to the code of written language to avoid such complex problems as, for example, stress and intonation. What we understand by the semantic and the pragmatic component of the ordered triple will be clarified in Chapters Two and Three of the present paper.

The notion of the above ordered triple has proved to be a necessary device for analysing such language expressions as are traditionally called clausal. For non-clausal language expressions, however, it seems to be possible to reduce the third, pragmatic component to a **constant** and, for the sake of simplicity, to deal only with **ordered pairs**:

[5] The authors are greatly indebted to Jan Firbas, who carefully read the preliminary version of the present paper and raised a number of useful questions and pertinent objections and made some fruitful suggestions which influenced the final version. He was also kind enough to help the authors to re-formulate many an obscure passage of the manuscript.

$$\langle \textit{semantic component}, E\rangle$$

This simplification should not imply that in such cases the pragmatic component has been left quite out of account, but, since it differs in certain respects from that of a clausal expression, the present solution enables us to differentiate the former from the latter without using a complicated notation.

In spite of the fact that the ordered pairs and triples represent the main topic of Chapter Three, we have made a few remarks about them here in order to show the place of the semantic component, which is to be dealt with in Chapter Two.

Chapter Two

CONCEPTS

The semantic component of the above ordered pairs or triples is in our conception represented by the so-called **concepts.** This is a notion taken from logical semantics, discussed and elaborated especially in connection with G. Frege's theory of sense (Frege 1892). Currently this theory is being most consistently developed by A. Church (1956), while W. V. O. Quine (1953) represents a kind of "anti-Fregean" opposition.

One important point is to be made here. On the one hand, further ideas concerning the present theory of language are not strictly dependent on a detailed theory of concepts, and can be set forth with a mere assumption that the concepts simply do exist (a procedure adopted by Church); hence the outline of the system of concepts adduced below is only to illustrate the fact that the realm of concepts is open to rational analysis and the struggle for exactness need not rule out the intuitive aspect of the matter. On the other hand, however, a full appreciation of all the reasons leading to a particular solution would probably require to refer to the cited literature.

The basic idea of the theory of sense consists in the assumption that we understand language expressions, not because we know what they are referring to in the actual world, but because we connect them with the so-called sense, which—in principle—enables us to identify the referent. The traditional Fregean theory distinguishes two kinds of semantic relation connected with a language expression: the relation of reference (denotation), connecting a language expression with its referent, i.e., with the object of the "actual world" denoted by this expression, and the relation of expressing, attaching a certain sense to a given language expression.

Recently, an interesting conception has been advanced (Tichý 1971), shedding new light on the traditional Fregean theory. The difference between this conception and the Frege-Church axis is quite apparent in two points:

a) For Church the sense of a language expression is the concept of its erferent. The realm of concepts is a realm of postulated entities, the essence of which is not further analysed and is Platonian in character. On the other hand, P. Tichý (in correspondence with K. Ajdukiewicz's conception)[6] regards concepts as procedures that enable us to identify what a given language expression "describes".

b) Church has preserved the duality of the relation of reference (denotation) and that of expressing. P. Tichý (1971) has convincingly shown that this duality leads to counterintuitive or even absurd consequences. He has abandoned the notion of sense and gave reasons for the thesis whereby a language expression either denotes (refers to) a certain object in the actual world directly, by fiat (this is the case of the so-called proper names), or denotes (refers to) a certain concept. What remains as the basic semantic relation is the relation of reference, which in the typical cases, however, relates to the concept of the object and not to the object itself.

From the viewpoint of logical semantics, any language is determined by a given set of formal expressions on the one hand, and by a non-empty set of objects about which the language can "speak", the so-called **universe,** on the other. According to P. Tichý's theory (1969), we are assumed to have at our disposal a certain number of elementary empirical tests, which can be applied to the elements of the universe or to the ordered n-tuples of these elements ($n = 0$ is not excluded). The results of the tests may be either positive or negative. We do not know in advance what the result of the application of the k-th m-ary test to the i-th n-tuple of the elements of the universe will be. Let us imagine that (by means of 1's and 0's, for instance) we put down all the possibilities resulting from the application of all our tests to all the elements or n-tuples of elements of the universe. We shall arrive at a certain number of sequences (finite in the case of the finite number of tests and elements) of 1's and 0's. These sequences will represent the so-called **possible worlds** over the given universe. Only one of them is the **actual world**; its representation is given by putting down the results of such tests as have actually been applied to the universe.

Let us turn to the notion of **procedure.** By a procedure we understand a prescription determining the sequence of certain steps. The steps are of two kinds; their results are either exclusively dependent on the results of the preceding steps (autonomous steps), or they are dependent on the state of the world (empirical steps, which may be regarded as an application of a certain test). If the prescription is of algorithmic character, we might explicate the term "procedure" by means of the notion of the Turing machine.

Owing to the possible presence of empirical steps, we do not generally know what will be the outcome of any given procedure. The outcome is, therefore, dependent on the state of the world and in different "possible worlds" may be different. If the result of a certain procedure is the same in any possible world, we shall speak of an autonomous procedure. If in any possible world the result of procedure P_1 is the same as that of procedure P_2, we shall speak of P_1 as being intensionally equivalent to P_2.

Take a set of procedures that are mutually intensionally equivalent. We call any such set a **concept.**

Let n be an integer. Thus an n-ary concept will be a set of n-ary procedures that are mutually intensionally equivalent. Propositional concepts consist of procedures the result of which is always a truth-value. A **proposition** is

[6] Cf. K. Ajdukiewicz (1965), esp. pp. 20—23.

a nullary propositional concept (i.e., consisting of nullary propositional procedures). A **property** is a singulary propositional concept, a **relation** is an n-ary propositional concept for n $\geqq$ 2. An individual concept consists of nullary procedures the result of which is always an element of the universe.

Hence unless they are proper names, separate language expressions do not directly refer to (denote) the elements of the given universe, the particular classes or relations in this universe. If at all, the former refer to the latter indirectly, by means of individual concepts, properties or relations-in-intension, etc.

Let us take some examples. We know what the English word *smoker* means, not because we know who is a member of the class of smokers, but because the word refers to (denotes) a property, i.e., because it refers to (denotes) a certain concept. For simplicity's sake we can say that it refers to (denotes) a certain singulary propositional procedure, i.e., such a procedure as can always be applied to a certain element of the universe and whose result will be 'truth' in some cases and 'falsehood' in others.

It is important that we do not know in advance what the class of people having undergone this procedure with the "positive result" will look like. We gradually become familiar with this class thanks to the application of the mentioned procedure to the universe. As the results of this procedure are dependent on the state of the world, i.e., on the extralingual factor, we are apparently having to deal with a non-autonomous procedure.

Similarly the expression *the English Prime Minister of 1970* refers to (denotes) an individual concept identifying quite a definite individual. (Which individual is dealt with cannot be gathered beforehand, merely on the grounds of the language itself.)

The compound expression

(1) *The English Prime Minister of 1970 is a smoker.*

refers to (denotes) a proposition; we have to deal with a procedure identifying a truth-value. As we again do not know in advance what result we shall obtain, we can speak of an empirical concept. This explains the fact that the sentence conveys (non-trivial) information. On the other hand, the sentence

(2) *If John is younger than Peter, the latter is older than the former.*

also denotes a proposition, but the result of the respective procedure will apparently be 'truth' in all possible worlds. We are dealing, therefore, with an autonomous procedure, the result of which is independent of the state of the world. Anybody who understands the given language is able to decipher the truth-value of sentences denoting autonomous concepts. In our case, (2) is an analytically true sentence. Such sentences are not informative; they do not carry information about the world, as has been explained above.

The concept denoted by sentence (1) is evidently not independent of the concepts denoted by the expressions *smoker* and *the English Prime Minister of 1970*; there is a possibility of finding a binary operation which, out of the concept of the type 'individual concept' and that of the type 'property', develops a concept of the type 'proposition'. In this way it is generally possible to build up n-ary operations on concepts for n $\geqq$ 0. Nullary operations on concepts are the concepts themselves. A singulary operation on concepts may be exemplified by the operation of negation: if applied to a proposition, it produces another proposition; if the former proposition results in 'truth', the latter results in 'falsehood' and vice versa. Other operations on concepts are those applying a property (a relation-in-intension) to an individual concept (an n-tuple of individual concepts), or binary operations on propositions, denoted by logical connectives, quantification operations, etc.

The idea of introducing operations on concepts provides a ground for constructing an objective system (i.e., one independent of language) of the formation of new concepts out of those already given. It seems to be palpable that the logical syntax is hereby provided with an objective motivation; the rational syntax is constructed in such a way that the operators that form compound expressions out of single ones denote operations on concepts.

The above theory of concepts contributes to the satisfactory solution of a range of semantic problems (e.g., synonymy being regarded in this theory as the case in which the respective expressions denote intensionally equivalent procedures and therefore elements of the same concept) as well as a number of difficulties frequently occurring in current intensional semantics. At the same time an important trait of every kind of rational intensional semantics has been preserved: the concepts are objective, language-independent entities. Nor is there any danger of psychologism: the concepts are not of a mental character (like mathematical functions); what is mental in character is the process of using them.

Chapter Three

ORDERED TRIPLES AND THEIR PRAGMATIC COMPONENTS

The concept defined as a set of identification procedures can be considered an important link between the lingual and the non-lingual sphere of mental processes. In dealing with a concept within the sphere of a natural language, we have to regard it as one of the members of an ordered pair (or—more precisely—at least an ordered pair):

(1) $\langle C, E\rangle_{U_1}$

where E is a formal expression of a natural language,[7] connected with the given concept C with respect to a given universe U_1. (For the purpose of this paper we shall consider only one universe and shall, therefore, drop the subscript U_1 in the following examples.)

For two ordered pairs $\langle C_1, E_1\rangle$ and $\langle C_2, E_2\rangle$, we introduce the following definition rules:

(2) $\langle C_1, E_1\rangle$ **syn** $\langle C_2, E_2\rangle \equiv C_1 = C_2$

(3) $\langle C_1, E_1\rangle$ **hom** $\langle C_2, E_2\rangle \equiv E_1 = E_2 \wedge C_1 \neq C_2$

(4) $\langle C_1, E_1\rangle = \langle C_2, E_2\rangle \equiv C_1 = C_2 \wedge E_1 = E_2$

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[7] E is to be regarded as type and not as a token.

(2) and (3) represent the synonymy and the homonymy rule respectively. The relation of identity in (4) may be regarded as a special case of synonymy.

Taking what is in traditional linguistics called the parts of speech and examining them from the point of view of the above ordered pairs, we come to the conclusion that the first member of the pair is for our purpose delimited in too narrow a way. For example, the first member of the ordered pair representing conjunctions is to be regarded, not as a single concept, but as an operation on concepts. We shall, therefore, introduce an n-ary operation on concepts O_c (for $n = 0, 1, 2, 3, \ldots$) as the first member of the ordered pair, single concepts being represented by a nullary O_c:

(5) $\langle O_c, E \rangle$

After V. Mathesius,[8] there are two main spheres in the synchronic description of a natural language viewed from the functional standpoint, i.e., from the standpoint of a language in operation: (i) functional onomatology (the science of naming) and (ii) functional syntax (the science of putting into relation). The former roughly corresponds to what has often been termed lexicology, and the latter bears a close relation to the traditional syntax in the sense of clause-formation or sentence-formation. As far as morphology is concerned, it runs across the preceding two spheres, its elements performing their functions in either one or both of them.[9]

Coming back to our conception, we can say that by means of the ordered pairs we are able to describe naming elements belonging to the sphere of onomatology. For simplicity's sake, let us take into account only such elements as are traditionally regarded as members of one of the parts of speech[10] and examine them from the point of view of the ordered pairs. Each of them has its form E and, with the exception of interjections,[11] each of them may be regarded as a nullary or a non-nullary operation on concepts. Viewed in the light of Morrisian semiotics, the above onomatological elements are sufficiently determined by the syntactic dimension (represented by E in our ordered pair) and the semantic dimension (represented by the connection of O_c with E). The third, pragmatic dimension, representing the relation between the ordered pair and the language user, is in this case restricted to a constant, i.e., to one possible way of interpretation, not allowing the language user to take more than one and the same attitude to any of the ordered pairs.

In the sphere of traditional syntax, the situation has proved to be basically different. According to J. Vachek's definition, "the sentence (clause) is an elementary verbal act of taking a standpoint towards some reality".[12] It is

[8] See V. Mathesius (1963) and cf. also Poldauf (1967.7).

[9] Partly in different terms, but most clearly expressed in Poldauf (1967.21).

[10] There are, of course, onomatological elements other than those belonging to the parts of speech. Attributive constructions (taken as wholes and describable by means of ordered pairs) may serve as an example.

[11] Interjections represent something of a problem. We are in doubt as to whether some of them contain the semantic component (the concept or the operation on concepts) at all. We are inclined to think that in some cases they can be described by means of an ordered pair $\langle E, A \rangle$. In other cases where some kind of semantic component may be traced, they would probably represent an ordered triple $\langle O_c, E, A \rangle$. For the explanation of the symbol A, see further text of the paper.

[12] J. Vachek, J. Firbas (1962.92). The original wording is: "Věta je elementární slovní zaujetí stanoviska k nějaké skutečnosti."

the taking of a standpoint, or—in other words—the attitude of the language user, that seems to be the decisive criterion of the distinction between clausal and non-clausal expressions of a natural language.

To describe a sentence (clause), we introduce an ordered triple

(6) $\langle O_c, E, A \rangle$

where O_c is an n-ary operation on concepts, E is a formal expression of a natural language, and A is a certain point in the "space" of the language user's attitudes towards the corresponding operation on concepts.

We hold that the formal expression E is a result of attaching one of the many possible attitudes to O_c. As a matter of fact, in normal interhuman communication the language user communicates about two relatively different components: (i) **concepts (or objects)** and (ii) **his attitudes towards them.** A clear distinction between the two components is blurred by the fact that they are both expressed by means of the **same formal device,** i.e., the formal apparatus of a natural language. In any further discussion, the first component, represented by O_c, will be presented in the form of a standard logical notation, which is to be called **a conceptual notation,** while the third of the components will be indicated by various superscripts of A. The resulting E will be given in a natural language notation. Let us take some simplified examples:

(7) $\langle S(c)$, *Charlie is a smoker.*, $A' \rangle$

(8) $\langle S(c)$, *Is Charlie a smoker?*, $A'' \rangle$

(9) $\langle S(c)$, *Let Charlie be a smoker.*, $A''' \rangle$

$S(c)$ is a usual notation in first order predicate calculus, S denoting the concept of being a smoker, c denoting the individual 'Charlie'. In all the three examples the relation between S and its argument c remains exactly the same. What changes, however, is the attitude of the language user towards the relation, expressing a statement in (7), a question in (8), and a command in (9). There might, of course, be found a large number of other possible attitudes to be attached to O_c. In order to be able to deal with them in our discussion, we intend, tentatively at least, to divide and order them in a certain way.

A is to be understood as a certain point in an n-dimensional space **A**, each dimension representing a certain kind of attitude:

(10) $\mathbf{A} = \langle \mathrm{A}^1, \mathrm{A}^2, \ldots, \mathrm{A}^n \rangle$

For our purpose we have tentatively chosen $n = 5$:

(11) $\mathbf{A} = \langle \mathrm{A}^1, \mathrm{A}^2, \mathrm{A}^3, \mathrm{A}^4, \mathrm{A}^5 \rangle$

A^1 represents the attitude of consent or dissent of the language user with regard to a given concept or operation on concepts O_c.

(12) $\langle S(c)$, *Charlie is a smoker.*, $\langle A^{con}, A^2, A^3, A^4, A^5 \rangle\rangle$

(13) $\langle S(c)$, *Charlie isn't a smoker.*, $\langle A^{dis}, A^2, A^3, A^4, A^5 \rangle\rangle$

(14) $\langle \sim S(c)$, *Charlie isn't a smoker.*, $\langle A^{con}, A^2, A^3, A^4, A^5 \rangle\rangle$

(15) $\langle \sim S(c)$, *Charlie is a smoker.*, $\langle A^{dis}, A^2, A^3, A^4, A^5 \rangle\rangle$

It might seem to us at first glance that the attitude of consent or dissent is rather superfluous, as the positive or negative form of the sentence may well be determined solely by the negator ~ in the conceptual notation. This objection would have full force if we were just dealing with sentences of a declarative character. When examining non-declarative sentences, however, we come to the conclusion that A^1 is a very important dimension of the attitudinal space, in that it assists in solving many problems connected, for example, with imperatives, the expressions *yes*, *no*, and the like.[14]

A^2 represents such attitudes as are usually termed modalities in the broad sense of the word. Our tentative classification of A^2 is based on V. Šmilauer's division of sentences into declarative, interrogative, desiderative, imperative and exclamatory, which takes into account the role played by various degrees of the intellectual, emotional, and volitional part of mental phenomena reflected in human speech. (This approach has evidently its origin in Bühler's distinction of three language functions: Kundgabe, Ausdruck, Appell.)

V. Šmilauer tried to make the above distinction clearer by means of the following graph (1966.21):

INTELLECT				**VOLITION**
declarative		interrogative		imperative
	exclamatory		desiderative	
		EMOTION		

Let us regard the five kinds of sentence as five different points of the coordinate A^2, representing the second dimension in the attitudinal space **A**. As in the case of A^1, the respective points of A^2 will be distinguished by means of superscripts. As the values of the other four dimensions in the following examples do not change, we shall replace the letters denoting the unchanging kinds of attitude by dots in order to simplify the notation.[15]

(17) ⟨*S*(*c*), *Charlie is a smoker.*, ⟨., A^{decl}, ., ., .,⟩⟩

(18) ⟨*S*(*c*), *Is Charlie a smoker?*, ⟨., A^{inter}, ., ., .,⟩⟩

(19) ⟨*S*(*c*), *Let Charlie be a smoker.*, ⟨., A^{imper}, ,. ., .,⟩⟩

(20) ⟨*S*(*c*), *May Charlie be a smoker.*, ⟨., A^{desid}, ., ., .⟩⟩

(21) ⟨*S*(*c*), *Charlie is a smoker!*, ⟨., A^{excl}, ., ., .⟩⟩

As may have been gathered from the above examples, the conceptual notation remains exactly the same throughout. We hold that the concept given by the operation of applying the property of being a smoker to the individual Charlie does not change within our examples, thus bringing the sentences to a common denominator in the form of a **conceptual core.** On the other hand, what has brought about the changes in the form *E* is, not a different

[14] For some remarks on these problems see p. 195—199 of the present volume.

[15] The term 'unchanging kinds of attitude' is to be interpreted as 'kinds of attitude that do not change within a given set of examples'. In (17) — (21), e.g., $A^1 = A^{\text{con}}$, $A^3 = A^{100\%}$, $A^4 = A^{\text{pre.simp}}$, $A^5 = A^{\text{rise},\underline{S}}$. (The superscripts of A^3 — A^5 are to be explained further in the text.) Generally speaking, all the attitudes are of changeable character, but at this stage of discussion we choose such examples as do not differ in the given four kinds of "dotted" attitude, just to illustrate the changes in *E* brought about by the different values of the attitude in question.

set of identification procedures, i.e., a different concept, but a different **attitude** of the language user to one and the same conceptual core $S(c)$.

A^3 represents such attitudes as are usually termed modalities in the narrow sense of the word, denoting various shades of the realness or unrealness of the action. For the purpose of this paper we have restricted the already narrow modality to the attitudes that express various degrees of (subjective) probability. Hence the attitudes under A^3 represent certain values of the respective co-ordinate according to whether they express the probability of 100 %, 99—90 %, 89—70 %, 69—50 %, etc. (In our case we hold that 0 % probability = 100 % improbability.) The percentual classification of the probability attitude is not so vague a thing as it might appear at first glance. This problem is currently being solved by psychologists. They really come to definite figures delimiting the percentual range of probability in the expressions and phrases under discussion by means of statistic evaluation of probability estimates made by a large number of examined persons.[16] Our division, however, is meant merely by way of illustration and is based on no such examination.

(22) $\langle S(c)$, *Charlie is a smoker.*, $\langle A^{con}, ., A^{100\,\%}, ., .\rangle\rangle$

(23) $\langle S(c)$, *Charlie must be a smoker.*, $\langle A^{con}, ., A^{99-90\,\%}, ., .\rangle\rangle$

(24) $\langle S(c)$, *Charlie may be a smoker.*, $\langle A^{con}, ., A^{89-70\,\%}, ., .\rangle\rangle$

(25) $\langle S(c)$, *Charlie might be a smoker.*, $\langle A^{con}, ., A^{69-50\,\%}, ., .\rangle\rangle$

The other half of the gamut can be obtained either by applying the attitude representing further decrease of probability in A^3 (together with the attitude of dissent in A^1) to the same conceptual core

(26a) $\langle S(c)$, *Charlie mightn't be a smoker.*, $\langle A^{dis}, ., A^{50-31\,\%}, ., .\rangle\rangle$

(27a) $\langle S(c)$, *Charlie may not be a smoker.*, $\langle A^{dis}, ., A^{30-11\,\%}, ., .\rangle\rangle$

(28a) $\langle S(c)$, *Charlie can't be a smoker.*, $\langle A^{dis}, ., A^{10-1\,\%}, ., .\rangle\rangle$

(29a) $\langle S(c)$, *Charlie is not a smoker.*, $\langle A^{dis}, ., A^{0\,\%}, ., .\rangle\rangle$

or by using a corresponding negative concept:

(26b) $\langle \sim S(c)$, *Charlie mightn't be a smoker.*, $\langle A^{con}, ., A^{69-50\,\%}, ., .\rangle\rangle$

(27b) $\langle \sim S(c)$, *Charlie may not be a smoker.*, $\langle A^{con}, ., A^{89-70\,\%}, ., .\rangle\rangle$

(28b) $\langle \sim S(c)$, *Charlie can't be a smoker.*, $\langle A^{con}, ., A^{99-90\,\%}, ., .\rangle\rangle$

(29b) $\langle \sim S(c)$, *Charlie is not a smoker.*, $\langle A^{con}, ., A^{100\,\%}, ., .\rangle\rangle$

A^4 represents the attitudes that are usually termed temporal indications. 'Temporal' in this case refers, not to time passing independently of a natural language, but to grammatical tenses, which are regarded here as formal manifestations of one of a language user's attitudes. The problem of the categorization and subcategorization of tenses is a very complex one and its solution is always connected with a particular natural language. For clarity's sake we shall confine ourselves to the traditional division of tenses in English and shall adduce a few examples in order to illustrate what we have in mind.

[16] Cf. I. Šípoš (1966).

(30) ⟨*S*(*c*), *Charlie is a smoker.*, ⟨., ., ., $A^{\text{pres.simp}}$,. ⟩⟩

(31) ⟨*S*(*c*), *Charlie is being a smoker.*, ⟨., ., ., $A^{\text{pres.cont}}$, .⟩⟩

(32) ⟨*S*(*c*), *Charlie has been a smoker.*, ⟨., ., ., $A^{\text{pre-pres.simp}}$, .⟩⟩

(33) ⟨*S*(*c*), *Charlie was a smoker.*, ⟨., ., ., $A^{\text{pret.simp}}$, .⟩⟩

(34) ⟨*S*(*c*), *Charlie had been a smoker.*, ⟨., ., ., $A^{\text{pre-pret.simp}}$, .⟩⟩

(35) ⟨*S*(*c*), *Charlie will be a smoker.*, ⟨., ., ., $A^{\text{future simp}}$, .⟩⟩

For the time being, we do not take into account such phenomena as the language user's emotions, intentions, etc. connected with the employment of different tenses. This problem could be solved by further subcategorization of tenses or, in our opinion more successfully, by combining A^4 with some other kinds of attitude (not introduced here).[17]

A^5 represents the attitudes that are involved in functional sentence perspective (FSP) or the organization of utterance (Daneš 1964). For the explanation of the basic terms of the theory of FSP, we refer the reader to the works of J. Firbas (esp. 1959, 1964a, 1964b, 1965, 1966). As with A^4, we shall again confine ourselves to adducing some examples for illustrative purposes. As the sentence *Charlie is a smoker* is from the point of view of FSP too trivial, we present a sentence containing more elements that are subject to changes in A^5.

(36) ⟨*K*(*c*, *a*), *Cain killed Abel.*, ⟨., ., ., ., $A^{\text{rise}, \underline{a}}$⟩⟩

(37) ⟨*K*(*c*, *a*), *Abel was killed by Cain,.* ⟨., ., ., ., $A^{\text{rise}, \underline{a}}$⟩⟩

(38) ⟨*K*(*c*, *a*), *Cain killed him.*, ⟨., ., ., ., $A^{\text{rise}, \underline{K}}$⟩⟩

(39) ⟨*K*(*c*, *a*), *It was Cain who killed Abel.*, ⟨., ., ., ., $A^{\text{fall}, \underline{c}}$⟩⟩

(40) ⟨*K*(*c*, *a*), *It was Abel whom Cain killed.*, ⟨., ., ., ., $A^{\text{fall}, \underline{a}}$⟩⟩

(41) ⟨*K*(*c*, *a*), *Kill him, Cain did.*, ⟨., ., ., ., $A^{\text{fall}, \underline{K}}$⟩⟩

(42) ⟨*K*(*c*, *a*), *Cain killed* ***Abel.***, ⟨., ., ., ., $A_{\underline{a}}$⟩⟩[17a]

Some problems of FSP as a dimension of the attitudinal space are to be dealt with elsewhere (see pp. 210—220 of the present volume). For the present purpose we have made a rough division of the possibilities of A^5 into three basic categories:

i) the theme-rheme sequence denoted as a rising one (rise) (see exx. 36—38);
ii) the rheme-theme sequence denoted as a falling one (fall) (exx. 39—41);
iii) the so-called second instance cases, in which a single element represents the rheme proper, all the other elements playing the role of an extensive theme (ex. 42).

Placed after the index denoting the respective category (the third category is denoted by the absence of this index), there are references to such elements of the conceptual notation as are to be considered rhematic, the underlined

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[17] For tenses dealt with within logical semantics, we refer the reader to Prior (1967), B. Miller (1972) and Ö. Dahl (1971). Some remarks on tenses representing one of the co-ordinates of the attitudinal space can be found on pp. 207—210 of the present volume.

[17a] For the indexical notation of the values of A^5, see p. 211 of the present volume.

element being the rheme proper. (In our case, however, we have given examples where only one element is rhematic.) Once the elements of the rhematic section are given, we can unambiguously determine the other elements (transitional, thematic) according to the rules given by J. Firbas (esp. in 1964a and 1965). (This rough division does not take into account the differences between elements in the thematic section.)

We have dealt briefly with the five co-ordinates of the attitudinal space, which have been chosen because they intuitively seem suitable for illustration and sufficiently important for inclusion. This does not mean, however, that the n-dimensional space should be restricted to $n = 5$. We consider it highly probable that the number of dimensions will be raised in the course of further research, and for this reason we leave the question of dimensions open to further discussion.

Two important points are to be made here: (i) As our conception of a natural language is, in its first stage, based on the examination of the written form of language, we shall distinguish only such attitudes within the attitudinal space as are distinguishable by means of formal criteria applied to a written text. (ii) As our main aim is to illustrate the role played by separate kinds of attitudes, we may not have sufficiently emphasized the fact that the point in the attitudinal space is simultaneously determined by all the co-ordinates, and hence its formal manifestation in the respective E represents not only one kind of attitude, but the result of their interplay.

Let us turn now our attention to the mutual relations of two ordered triples. If the identity of concepts or operations on concepts of the two triples is regarded as the basic condition of synonymy, it is possible to distinguish the following three kinds of synonymic relation:[18]

(43) $\langle O_{c1}, E_1, A_1\rangle\ \mathbf{syn}_{\mathrm{broad}}\ \langle O_{c2}, E_2, A_2\rangle \equiv O_{c1} = O_{c2}$

In the case of (43), we speak of synonymy in the broad sense of the word or, for short, of broad synonymy.

(44) $\langle O_{c1}, E_1, A_1\rangle\ \mathbf{syn}_{\mathrm{narrow}}\ \langle O_{c2}, E_2, A_2\rangle \equiv O_{c1} = O_{c2} \wedge A_1 = A_2$

(44) is a special case of broad synonymy, where not only O_c's but also attitudes are the same. We shall speak here of synonymy in the narrow sense of the word or, for short, of narrow synonymy.

(45) $\langle O_{c1}, E_1, A_1\rangle = \langle O_{c2}, E_2, A_2\rangle \equiv O_{c1} = O_{c2} \wedge E_1 = E_2 \wedge A_1 = A_2$

(45) is a special case of narrow synonymy, where not only O_c's and A's but also E's are the same and hence the two triples are identical. Identity may be, therefore, regarded as a special case of synonymy.

If the identity of the formal expressions E of the given two triples and the difference of their O_c's are regarded as the basic conditions of homonymy, it is possible to distinguish two kinds of homonymic relation:

(46) $\langle O_{c1}, E_1, A_1\rangle\ \mathbf{hom}_{\mathrm{broad}}\ \langle O_{c2}, E_2, A_2\rangle \equiv O_{c1} \neq O_{c2} \wedge E_1 = E_2$

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[18] A_1 and A_2 are points in the attitudinal space. Not to be confused with A^1, A^2 denoting values of the respective co-ordinates.

In (46) we speak of homonymy in the broad sense of the word or of broad homonymy.

(47) $\langle O_{c1}, E_1, A_1 \rangle$ **hom**$_{\text{narrow}}$ $\langle O_{c2}, E_2, A_2 \rangle \equiv O_{c1} \neq O_{c2} \wedge E_1 = E_2 \wedge A_1 = A_2$

(47) is a special case of broad homonymy, and we shall speak here of narrow homonymy.

In the case of the identity of attitudes in two ordered triples with other components being different, we shall speak of pragmatic unifunctionality.

(48) $\langle O_{c1}, E_1, A_1 \rangle$ **unifunc** $\langle O_{c2}, E_2, A_2 \rangle \equiv O_{c1} \neq O_{c2} \wedge E_1 \neq E_2 \wedge A_1 = A_2$

Let us take a look at the table showing the possibilities of comparison of the two ordered triples $\langle O_{c1}, E_1, A_1 \rangle$ and $\langle O_{c2}, E_2, A_2 \rangle$ in a simplified notation taking into account only conditions of the given relation.

(49)	$O_{c1} = O_{c2} \wedge E_1 \neq E_2 \wedge A_1 \neq A_2$	....		**syn**$_{\text{broad}}$
(50)	$O_{c1} = O_{c2} \wedge E_1 \neq E_2 \wedge A_1 = A_2$	....	**syn**$_{\text{narrow}}$	**syn**$_{\text{broad}}$
(51)	$O_{c1} = O_{c2} \wedge E_1 = E_2 \wedge A_1 = A_2$	... **identity**	**syn**$_{\text{narrow}}$	**syn**$_{\text{broad}}$
(52)	$O_{c1} \neq O_{c2} \wedge E_1 = E_2 \wedge A_1 = A_2$	... **hom**$_{\text{narrow}}$	**hom**$_{\text{broad}}$	
(53)	$O_{c1} \neq O_{c2} \wedge E_1 = E_2 \wedge A_1 \neq A_2$	....	**hom**$_{\text{broad}}$	
(54)	$O_{c1} \neq O_{c2} \wedge E_1 \neq E_2 \wedge A_1 = A_2$	... **pragmatic unifunctionality**		
(55)	$O_{c1} \neq O_{c2} \wedge E_1 \neq E_2 \wedge A_1 \neq A_2$	... **exclusion**		
(56)	$O_{c1} = O_{c2} \wedge E_1 = E_2 \wedge A_1 \neq A_2$	... **pragmatic multifunctionality**		

Six cases out of eight have already been dealt with. We hope that the case of exclusion does not need any comment. The last case (pragmatic multifunctionality)[19] has been ruled out by the requirement that the dimensions of the attitudinal space represent only such attitudes as are reflected in the written form of language. Hence in our conception every change in the attitudinal space must be reflected by a change in the formal expression *E*.

Chapter Four

LANGUAGE "DEAD"

As has already been stated in the previous chapter, we regard *E* as the result of the presentation of a given O_c and a given point *A* in the attitudinal space **A**. The result is recorded in the written code of a natural language. If we look upon *E* as simultaneously generated out of two sources (O_c and *A*), we need a generator of O_c's, a generator of *A*'s, a device transcribing O_c's into data that are relevant for constituting *E*'s as well as a device transcribing *A*'s into further data that are also relevant for *E*'s. Let us call the result of

[19] For multifunctionality within the theory of FSP, see J. Firbas (1966.250—4).

the former transcription D^1 and that of the latter D^2. In such a case we are in need of another device bringing D^1 into harmony with D^2. The above three devices may be regarded as three systems of transcription rules and the whole apparatus may be illustrated by the following flow chart:

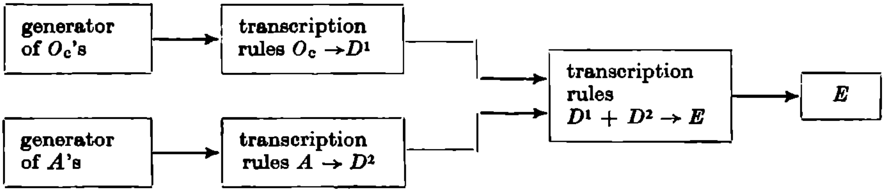

Table 1

Let us inspect the individual parts of the diagram.

For a moment we shall disregard the pragmatic aspect of the matter and deal only with the relation between the semantic and the syntactic components of ordered triples (or pairs). Similarly to Chomsky's conception, where the language in which he constructs the generation of other languages is different (or — at least — plays a different role) from these languages, our conception also requires the generation of a language$_1$ (L_1) by means of a language$_2$ (L_2). Contrary to Chomsky, our L_2 should primarily meet the demands, not of the syntactic, but of the semantic component of the ordered triple (pair), i.e., it should permit us to denote concepts, operations on concepts, etc., in short, it should provide us with the so-called conceptual notation. In our opinion, the most suitable L_2, used as the common starting point of the generation of various natural languages, is **one of the applied logical calculi.** At the very beginning of our discussions the first-order predicate calculus seemed to satisfy our demands. We have in fact been employing it so far, but merely to indicate the lines along which the present conception has developed. Fear of oversimplification induces us to think of three important reasons for speaking against the original choice:

1. In the frequent way of constructing the first-order predicate calculus, the logical connectives have an exclusively syntactic nature. Our aim, however, is to record the semantic role of connectives, which are regarded as elements denoting operations on concepts.

2. When analyzing a natural language, we can hardly disregard the occurrence of such expressions as cannot be fitted in with first-order logic (e.g., predicates playing the role of arguments with regard to other predicates, etc.).

3. If we wish to be consistent with the semantic conception according to which meaningful expressions — with the exception of proper names — denote concepts, the notation of first-order logic will prove to be quite insufficient.

At the same time the above objections to using the first-order predicate calculus may lead to the suggestion of a more suitable logical device, which is, in our opinion, the **theory of types** constructed by means of the elementary types ι, o, μ (ι being the type of an individual, o the type of a truth value, and μ the type of a "possible world"). (Cf. J. Kemeny 1986, P. Tichý 1971.253—5.) Composed types are constructed in the way of standard composition. At this phase only the very simple examples will be given (bracketing from the left is omitted).

The restricted scope of the present paper prevents us from giving an exact exposition of the principles on the grounds of which the theory of types is constructed. Nevertheless, to make the basic idea clear, we shall at least try to show the consequences of this theory with regard to the constants and the variables of a language:

a constant of the type ι refers to an individual,
a constant of the type o refers to a truth value,
a constant of the type μ refers to a possible world;
the range of a variable of the type ι is the universe,
the range of a variable of the type o is the set of truth values,
the range of a variable of the type μ is the set of possible worlds.

A class (of the first order) is a function from the universe to the set of truth values. It is, therefore, of the type $o\iota$. Thus

a constant of the type $o\iota$ refers to a class,

the range of a variable of the type $o\iota$ is the set of all the subsets of the universe,
etc.

The fact that the concepts are, strictly speaking, functions from the set of possible worlds to a set of individuals or truth values or classes or relations will prove to be of great help in the course of the following explanation.

The type of an individual concept (and hence the type of a constant denoting such a concept) is $\iota\mu$, the type of a proposition is $o\mu$, the type of a singular propositional concept (or the type of the property of the first order) is $o\iota\mu$, the type of a binary propositional concept is $o\iota\iota\mu$, etc. The formation rules for expressions and especially for sentences of the theory of types are given inductively in a standard way.

The conceptual notation in the theory of types using type μ is relatively complex, and at first glance is not so lucid as the notation in the first-order predicate calculus. Nevertheless, it enables a more refined semantic analysis of a natural language. On elaborating our conception in detail, we shall be compelled to construct some version of the "type calculus", probably something simpler than the $L\mu$ of P. Tichý.

A further device necessary for setting the semantic and the syntactic components of ordered triples (pairs) into relation is the system of transcription rules connecting conceptual notations in L_2 with the corresponding notations in the code of the natural language L_1. As a matter of fact, we have to deal with **the vocabulary (V) containing the list of the extralogical constants in L_2 together with their translations into L_1**. Every entry on the left side of the vocabulary V is a conceptual notation of some concept and is, therefore, associated with some type-sign.[20] If necessary, the conceptual notation of

[20] At this point there is a possibility of introducing, not only types, but also "sorts" of variables. Such a division of the universe of discourse on whose basis the above "sorts" would be introduced should prevent us from generating nonsensical sentences (such as *The odd numbers are blue.*).

a compound concept, consisting of the concept in question and some other concepts, may also be adduced. The right side of V is formed either by the class of expressions of L_1 or, more conveniently, by its proper subclass, which might play the role of some "lexical generator" in L_1. (In Indoeuropean languages the members of this subclass being substantives in the nominative singular, verbs in the present active infinitive, etc.)

Having employed an applied logical calculus (for the conceptual notation) and the vocabulary V, we can—in the above way—proceed from a given operation on concepts O_c to a corresponding D^1.

Let us now take into consideration the pragmatic component of an ordered triple and follow the other branch of the generation of E.

As the formal expression E is, so to speak, co-generated by a given point in the attitudinal space **A**, we shall further have to employ a device which will turn various A's into data that take part in constituting the corresponding E in L_1. First of all we need to identify a given point in the attitudinal space **A**. This may be done by a **system of indices similar to that adduced in the previous chapter** (see pp. 167—170. In this case the indices characterize the pragmatic component in the same way as the conceptual notation characterizes the semantic component.

To proceed any further in the direction towards E, we shall have to introduce a system of rules transcribing given indices into the data assisting in the formation of E in L_1. This system will be called **pragmatico-syntactic tables (PS tables)** and may be regarded as a sort of vocabulary translating the pragmatic indices into the corresponding instructions that are applicable to the code of L_1. Hence the PS tables represent a counterpart of the vocabulary V (which in turn may be looked upon as a sort of semantico-syntactic tables). The preference for the term 'tables' is supported by the fact that certain indices exclude one another, others firmly stick together, and generally, they are to be taken in configurations, i.e., as n-tuples characteristic of a certain point A. In such a case the tabular arrangement seems to be more appropriate than any other.

On the grounds of pragmatic indices and the PS tables we may proceed from a certain point A to the data D_2 leading to the construction of E in L_1. As has been mentioned before, the direct composition of D_1 and D_2 (the partial results of the two branches of generation) may break some rules of L_1, and for this reason we need a further device to bring D_2 into harmony with D_1. Let this device be called **syntactico-combinatory tables (SC tables).** The SC tables operate within the sphere of formal syntax of L_1. To adduce a trivial example, we may suppose to have obtained *Peter catch a fever* as the result of the semantic branch of generation and *-ed* as the result of the pragmatic branch of generation (the translation of the n-tuple of indices $\langle A^{\text{con}}, A^{\text{decl}}, A^{100\%}, A^{\text{past simp}}, A^{\text{rise,f}}\rangle$ being an instruction saying: change nothing with regard to D_1 with the exception of adding *-ed* to the word corresponding to the predicate). By means of the SC tables the '*catch+ed*' is transcribed as '*caught*'.

The flow chart of Table 1 can be made more specific by inserting the newly adduced terms into it:

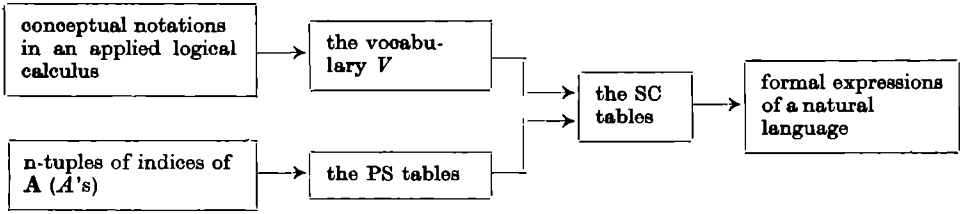

Table 2

Bearing in mind our previous considerations, we intend to employ the following two procedures:

I. On the grounds of a given sentence (expression) in the applied logical calculus containing the elements of the left half of the vocabulary V, given pragmatic indices, the vocabulary V, the PS tables and the SC tables, to construct a sentence (expression) in L_1. (Synthesis.)

II. On the grounds of a given sentence (expression) in L_1 to find such a sentence (expression) in the applied logical calculus with the elements of the left half of the vocabulary V and such pragmatic indices so that procedure I based on these data leads to the construction of the given sentence (expression) in L_1. (Analysis.)

In view of the terms that have already been introduced, we now intend to offer tentative definitions of the above ordered pair, the ordered triple, and the natural language.

An ordered pair $\langle O_c, E\rangle$ with regard to the vocabulary V and the SC tables is a pair where O_c is an operation on concepts which is not a proposition and whose conceptual notation is a well-formed expression built up out of conceptual notations on the left side of the vocabulary V, and E is an expression that is produced by applying the SC tables to the translation of the corresponding constituents of the notation of O_c.[21]

An ordered triple $\langle O_c, E, A\rangle$ with respect to the vocabulary V, the SC tables and the PS tables is such a triple where O_c is a proposition denoted by the conceptual notation which is built up out of the notations on the left side of the vocabulary V, A is a point in the attitudinal space **A**, and E is an expression that is produced by applying the PS tables and the SC tables to the translation of the corresponding constituents of the notation of O_c.

Language with respect to the vocabulary V**, the PS tables, and the SC tables** is a set of ordered pairs and triples with respect to V, the PS tables, and the SC tables.

If the vocabulary V, the PS tables, and the SC tables are compiled on the grounds of a natural language (as was the case in our discussion), we can speak of a natural vocabulary V, natural PS tables and natural SC tables.[22]

Hence a natural language may be regarded as a set of such ordered pairs and triples that there exist a natural vocabulary V, natural PS tables and

[21] The scope of operation of SC is not restricted to bringing D^2 into harmony with D_1 The SC tables may also perform their function within the data of D_1.

[22] We regard 'natural' in collocations with 'language' and in similar expressions a primitive term (which is not defined).

natural SC tables such that the above pairs and triples are pairs and triples with respect to them.

As may have been gathered from what has been said so far, we have dealt with a natural language as a device that is perpetually placed at the language user's disposal, but which has not yet been used in the very act of communication. As a matter of fact, we have spoken about "dead" expressions of a natural language, about "dead" sentences, which may be brought to life or, in other words, changed into utterance events[23] only when realized by the language user in a certain communicative situation. In transferring our attention from language "dead" to language "live", we have to resume the notion of pragmatics and to view it this time from a different angle.

Chapter Five

LANGUAGE "LIVE"

If we want to generate (or analyze) sentences of a natural language independently of the communicative situation, then pragmatics is represented by the pragmatic component within the ordered triple, i.e., by a certain point A in the attitudinal space **A**. The data concerning the attitudes (the indices determining the values of the co-ordinates of this space and in this way locating the given sentence in **A**) form the relevant input of the PS tables. This sphere of pragmatics, which deals with potential attitudes of potential language users and which directly manifests itself in the syntactic component of an ordered triple, is to be termed **internal pragmatics** and the respective indices **internal (pragmatic) indices.** (In this paper internal indices are given by the values of the separate co-ordinates of the attitudinal space.)

If, however, we want to investigate sentences that are set into communicative situations, we have to introduce the notion of **external pragmatics,**[24] characterizing the respective situation in which the given sentence has been uttered. This can be done by means of **external (pragmatic) indices,** determining the spatio-temporal location and other basic properties (e.g., identifying the language users as speakers/writers or listeners/readers, etc.) of the situation in which the given sentence occurs. Hence

(57) $\langle O_c, E, A\rangle_{S_i}$

denotes an utterance event represented by the sentence $\langle O_c, E, A\rangle$ uttered in the situation S_i (which is determined by the external indices characteristic of S_i).

Let S_1 be a situation existing at a point of time in which the sentence B is uttered. It is clear that the truth value of the (dead) sentence B is determined—if determined at all—semantically; if the type calculus mentioned above is applied, the type of the respective proposition would be $o\mu$. But the truth value of the communicative realization of the sentence B is already a matter

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[23] For the notion of utterance event, see F. Daneš (1964.229).

[24] The terms 'internal' and 'external', distinguishing the two kinds of pragmatics, were kindly suggested to us by L. Tondl.

of external pragmatics. Let B be the sentence *My brother is a smoker.* If S_1 is a situation in which the language user uttering the above sentence has a brother who is a smoker, the realization (uttering) of the sentence B in the situation S_1 is to be considered true. In a situation S_2 different in this point from S_1, the realization of B is to be considered false. (If the speaker has no brother at all, the realization of B has no truth-value.)

In the same way as the truth value in semantics is generally dependent on the possible world, the truth value in external pragmatics is generally dependent on the communicative situation, i.e., the situation in which the sentence is being uttered. On the analogy of semantics, where we distinguish analytic sentences, i.e. sentences that are true in any possible world (or false in any possible world), we can — also in external pragmatics — introduce the category of such realizations of sentences (such utterance events) as are true (false) in any communicative situation. Let such realizations of sentences be called **E-pragmatically[25] ever-true (ever-false) utterance events.** It is possible to show that the realization of any analytically true (false) sentence is E-pragmatically ever-true (ever-false) but this rule does not hold vice versa: there are E-pragmatically ever-true (ever-false) utterance events that are not realizations of analytically true (false) sentences. (E.g., a language user's realization of the non-analytic sentence *I am alive* is E-pragmatically ever-true.)

External pragmatics has no direct bearing on the syntactic component E of an ordered triple. There is, however, a link between the communicative situation and the set of ordered triples (pairs), consisting in the restriction of the number of triples (pairs) that can be used in a given situation. The procedure of restriction operates in two directions: through semantics and through internal pragmatics.

We shall first pay our attention to how external pragmatics is linked with the sphere of semantics. Let us take our sentence *Charlie is a smoker.* If this sentence is to be uttered in a conversation, *Charlie* cannot correspond to the concept of 'Charlie par excellence', but the whole sentence must be represented by an ordered triple where the conceptual notation includes 'Charlie' as a proper name corresponding to a person who is at the same time determined as such by the external indices of the given situation S_1. The condition for understanding the sentence in this way is that both the speaker and the hearer are supplied with the same number of relevant external indices characterizing the situation. Should this be the case with the speaker, but the hearer had not sufficient knowledge of the situation, i.e., a sufficient number of external indices, at his disposal, or vice versa, the hearer would probably ask the following respective questions: *Who do you mean by Charlie?* or *Which Charlie, there are two of them at this party.* We hope it is quite apparent that the utterance event *Charlie is a smoker.* must be represented by such an ordered triple where the element corresponding to *Charlie* in the conceptual notation is **situation-bound.** The utterance event *I am a smoker.* may serve as another example. The semantic element corresponding to *I* must be situation-bound in such a way that it is identified by the given external indices as the speaker. As the situation (external indices) may be given either by extralingual conditions

[25] 'E-pragmatically' is derived from 'externally pragmatic', which is in turn derived from 'external pragmatics'.

of the utterance event or by its lingual context, the above holds good also for *Charlie said: 'I am a smoker'*.

On investigating utterance events corresponding to our ordered triples (pairs) with the subscript S_1, we shall find it convenient to distinguish between situation-bound and situation-free items of our conceptual notation. As each of these items represents the semantic component of an ordered triple or pair of its own, we shall deal with them as such. For the time being we have mentioned only such situation-bound items of the conceptual notation as corresponding to the formal expressions *Charlie* and *I*. As a matter of fact, there are a great many of situation-bound words, such as personal, demonstrative and possessive pronouns, possessive adjectives, the words *today, yesterday, tomorrow, yes, no,* etc. While the last two expressions will apparently require to be represented by triples $\langle O_c, E, A\rangle$, all the others may be treated as pairs $\langle O_c, E\rangle$. The problem emerging in this connection is how to find an adequate conceptual notation indicating their situation-bound character.

Within the language of the theory of types applied to the basic types ι, o, μ, it is not possible to record concepts corresponding to situation-bound words. We have to enlarge the list of basic types and introduce a new type σ. The type σ will be **the type of 'communicative situation'**. Expressions whose type ends in σ are to denote a special kind of concepts, which will be termed here **sigmalized concepts**. The following example clarifies the nature of these concepts. Let us have the expression *the President of the ČSSR in 1970*. This expression has the type $\iota\mu$ and therefore denotes an individual concept, i.e., a concept that in a given universe identifies a certain idividual in any possible world. On the other hand, let us take the word *I*. This word has either the type $\iota\sigma$ or $\iota\mu\sigma$: it denotes a sigmalized individual concept, which in any possible communitative situation identifies a certain individual ($\iota\sigma$) or a certain individual concept ($\iota\mu\sigma$). Similarly the word *this* has the type $\iota(o\iota)\sigma$,[26] or $\iota(o\iota\mu)\sigma$, i.e., the respective concept identifies a certain individual in regard to a class or a property in any communicative situation. As for *yes* (analogically *no*), it will probably have the type $o\mu\sigma$, which means that in any communicative situation the respective concept identifies a certain proposition, namely the proposition that was denoted by the sentence uttered immediately before the uttering of the word *yes* (*no*). In the case of *yes* (*no*), we have to deal with the triple $\langle Y/o\mu\sigma, Yes, A\rangle$ ($\langle Y/o\mu\sigma, No, A'\rangle$), where A^1 has the value of consent (dissent). (For some comment on *yes* and *no*, see pp. 197—199 of the present volume.) By analogy, we can determine the types of concepts corresponding to the expressions *today*, *this year*, *in an hour*, etc.

In the light of what has been said so far it is necessary to bear in mind that the first member of an ordered pair or triple (representing an operation on concepts) is not a purely semantic component, because it very often contains sigmalized elements (i.e., elements whose type ends in the elementary type σ).

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[26] The motivation of this type is the following: 'this' refers to function f_1, which assigns any communicative situation (σ) a function f_2 (ι ($o\iota$)), where f_2 assigns any class ($o\iota$) an individual. Hence when uttered in front of a lion in a zoo, the expression *this lion* just refers to the lion in the zoo, which is of course the very individual that has been selected by the function f_2 which, in turn, has been selected by the function f_1 referred to by *this* in the given situation; on the other hand, f_2 selects the lion in question from the elements of the class of lions referred to by *lion*.

If such an element is of the type $\alpha\sigma$, where α is also a certain type, the corresponding concept is a function whose domain is the set of possible situations and whose range is given by the type α. The set of possible situations, however, is a matter of external pragmatics.

It may occur to us, of course, that the set of possible situations can be "semanticized" in that it can be understood as a set of possible worlds (in the semantic sense). Nevertheless, there is one point that induces us to distinguish type μ from type σ. To make the distinction clear, a few more words will have to be said on how the set of possible situations is conceived. (Our conception slightly differs from that offered by Dahl (1971) but basically comes close to it.)

For us, a possible situation is represented by a set of sentences that completely and non-contradictorily (even though perhaps falsely) describe the world, including its temporal development. Such a set of sentences may merely exist in an ideal case, in the mind of an omniscient "oracle". What always seems to be linguistically relevant is a certain finite subset of such sentences. Naturally, only one of these descriptions of the world exclusively consists of true sentences. Such a set would represent the "real situation". We shall further use the term 'situation' for any set of sentences that represents some possible situation. Thus any situation is a set of sentences, in which for any (temporal) moment t it is possible to single out a subset of sentences that speak about the world at the moment t. (This subset corresponds to Dahl's notion of 'temporally defined world-state'.)

Hence the set of possible situations is a set of possible worlds with respect to the language of the hypothetic omniscient (or, at least, multiscient) oracle. (For practical purposes, we could do with an oracle who knows, not everything, but only such things as are relevant for evaluating the "linguistic parameters" of the analyzed utterance event.)

Why do we distinguish the set of possible worlds (type μ) from the set of possible situations (type σ)? Why are we content with possible worlds in "pure semantics" and why do we need the notion of possible situation in (external) pragmatics?

It is simply because the language whose expressions we analyze is basically different from the language spoken by our omniscient oracle. What we call possible worlds are possible worlds with respect to the analyzed language, while what we call possible situations are possible worlds with respect to the language of the oracle.

Let us turn back to the problem of the first component of an ordered pair or triple and ask whether the above alliance of semantics with external pragmatics (through sigmalization) is necessary for further research. What we should like to show is that this alliance is of considerable methodological value.

Let us start with some formulations used by Dahl (1971) when he touched upon the role of 'indexical expressions'. Dahl distinguishes the 'extensional' and the 'intensional' meaning of the sentence. In his words "...the sentence *I am the President* has the same intensional meaning whenever it is uttered and whoever utters it. The extensional meaning of *I am the President* on the other hand, will be 'Nixon is President of the United States in 1971', if it is said by Nixon in Washington in 1971, and 'De Gaulle was President of

France in 1967' if said by De Gaulle in Paris in 1967. Thus, the extensional meaning is a function of two things: the intensional meaning and the situation." (p. 4). And further: "...the sentence (8) *He is tall.* is intensionally unambiguous, but extensionally unfinitely ambiguous, depending on whom it is said about." (p. 4).

Our approach to the conceptual component of an ordered triple enables us in a very intuitive way to clarify the fact that language expressions of the kind of (8), i.e., triples containing sigmalized elements in their first component, are 'intensionally' (we shall say: **semantically**) unambiguous and 'extensionally' (we shall say: **pragmatically**) ambiguous.

What does it in fact mean that sentence (8) is semantically unambiguous? In this connection 'semantically' apparently means 'only semantically, not pragmatically'. Hence the "(purely) semantic" analysis of the sentence *He is tall.* is one that abstracts from the (externally) pragmatic constituent represented by the type σ in the type-notation of the concept corresponding to the expression *he*. To say that sentence (8) is semantically unambiguous will therefore mean that the "desigmalized" concept corresponding to the expression *he* unambiguously identifies the person in question. Since, however, sentence (8) said by Mr. A about Mr. B and sentence (8) said by Mr. B about Mr. C refer to different individuals, unambiguity can be saved in the following way.

Suppose sentence (8) determines the respective person in a semantically unambiguous way whenever it is employed. (This is really the case in practice.) Since different employments of (8) may generally deal with different persons, there seems to be no way out but to admit that from the viewpoint of "pure semantics", employing sentence (8) in different situations in fact amounts to employing different languages. It is palpable that if sentence (8) is uttered by Mr. A about Mr. B, the semantic unambiguity of the sentence, given by the semantic unambiguity of the expression *he*, is guaranteed by the fact that any other employment of sentence (8) takes place in a different "language". In such a case we have managed to preserve unambiguity, but we have to pay for it by a rather contraintuitive consequence: What we should like to understand to be one language is broken up into as many separate languages as there are different employments of the "same sentence" in different situations.

To do away with the above "shortcoming" we propose an alternative solution: We do not abstract from sigmalization and hence we regard the expressions *I*, *here*, *today*, etc. as pragmatically ambiguous, which leads to 'extensional ambiguity' (Dahl) of the respective sentences.[27] The advantage of this approach is that it enables us to regard different employments of sentences of type (8) as different utterance events within the framework of one single language.

Any theory that is to respect the thesis that a natural language is not a fiction but really one single language cannot dispense with the participation of external pragmatics in the very conceptual notation.

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[27] Naturally, the value — we should, perhaps, say the semantico-pragmatic value — of the expression *he* is the person *A*, *B*, *C*, etc., according to the situation in which the expression is employed.

The other link between the situation and the respective ordered triple can be seen in the sphere of internal pragmatics, i.e., in the attitudinal space **A**. Let us suppose we have the conceptual notation recording the relation between 'Charlie' and his 'being a smoker'. On the basis of this notation and the attitudinal space **A**, we may generate as many ordered triples as there are different points in **A** (given by the number of different n-tuples of internal indices). As soon as we take the respective situation (external indices) into account, the number of possibilities of applying the different points of **A** will be restricted. Figuratively, we may say that a certain number of points in **A** will be ruled out by the given situation and hence the attitudinal space will shrink to the number of points that have not been ruled out by the respective external indices. Let us take a trivial example: If the sentence about Charlie being a smoker were uttered five years after his death, the external indices would very often rule out all present and future tenses in the temporal co-ordinate A^4, offering only the possibilities of past tenses. (For further comment on A^4 see pp. 207—210 of the present volume.) In a similar way the external indices restrict the possible range of use of the co-ordinate A^5, representing various kinds of functional sentence perspective. On the grounds of our preliminary attempts, we can say that the external indices may "influence" any of the co-ordinates and therefore the whole scope of the attitudinal space.

Dealing with utterance events $\langle O_c, E, A \rangle_{S_1}$, i.e., with ordered triples set into a certain communicative situation S_1, we have — for the time being — considered them to be ad hoc elements of language "live". To present the whole model of language "live" would mean to build up the **system of external indices** as well as the **system of rules relating these indices to the elements of language "dead"**, i.e., to our ordered triples and pairs. Both these systems are, in our opinion, automatically set in operation by every language user in the very act of communication. Even though the proposed solution seems to be a far-off vision nowadays, we have touched upon the idea of language "live" to throw some light on future possibilities and future tasks.

By way of conclusion the authors would like to inform the reader that the present paper was prepared for print in 1972. Since then the theory has been modified in accordance with the new development in both intensional semantics and general linguistics. A present-day version offering a detailed description of intensional semantics is to appear in Brno Studies in English 13 under the title The ordered-triple theory continued.[28]

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RESUMÉ

Třísložková teorie jazyka

Autoři navrhují teoretický rámec pro popis přirozeného jazyka, který bere v úvahu všechny základní složky jakéhokoli sémiotického systému a zachycuje tedy vztahy mezi uživatelem jazyka a reálným světem a vztahy mezi jazykem a uživatelem jazyka. Jinými slovy, navržený teoretický rámec důsledně přihlíží k syntaktické, sémantické a pragmatické složce jazyka (ve smyslu Morrisově) a pracuje s nimi jako s jednotným systémem.

Vychází se z předpokladu, že výrazy přirozeného jazyka jsou tvořeny syntaktickou, sémantickou a pragmatickou složkou a že každý výraz přirozeného jazyka může tedy být popsán jako uspořádaná trojice

$$\langle \text{sémantická složka, formální jazykový výraz, pragmatická složka,} \rangle$$

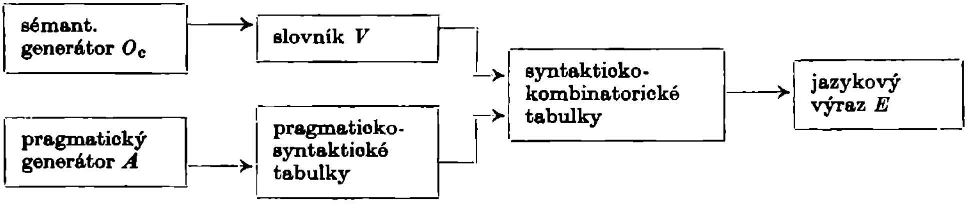
tj. symbolicky $\langle O_c, E, \mathbf{A} \rangle$,
kde syntaktická složka je reprezentována jazykovým výrazem E, sémantická složka O_c představuje n-ární operaci s koncepty (n = 0, 1, ...) zachycenou v podobě konceptuální notace a pragmatická složka **A** představuje prostor postojů uživatele jazyka k odpovídajícím operacím s koncepty (tj. k obsahu sdělení). O_c se zapisuje ve formě standardní logické notace. Je to jazyk intenzionální logiky zvaný $L\mu$-jazyk a vycházející z Churchova typového kalkulu. **A** představuje bod ve vektorovém prostoru postojů uživatele jazyka daný hodnotami jednotlivých souřadnic v prostoru **A**. Každá souřadnice reprezentuje jistý druh postoje: A^1 — postoj souhlasu nebo nesouhlasu, A^2 — postoj označovaný obvykle jako modalita v širším slova smyslu, tj. členění vět na oznamovací, tázací, rozkazovací, přací a zvolací, A^3 — postoje charakterizované termínem „modalita v úzkém slova smyslu" a vyjadřující různé stupně reálnosti nebo nereálnosti děje, A^4 — postoje „časové" a A^5 — postoje uživatele jazyka vedoucí k různým způsobům organizace výpovědi, tj. k různým aktuálním členěním. Pragmatická složka **A** představuje tedy to, co nazýváme „vnitřní pragmatika".

Mají-li být zkoumány věty jazyka začleněné do komunikačních situací, musíme zavést pojem „vnější pragmatiky" a charakterizovat příslušnou situaci, v níž byla daná věta pronesena. To lze provést pomocí vnějších (pragmatických) indexů určujících časo-

prostorovou lokaci a indentifikujících mluvčího/posluchače v situaci, v níž se daná věta vyskytuje. Symbolicky $\langle O_c, E, A\rangle_{S_i}$
tento zápis označuje výpovědní událost reprezentovanou větou $\langle O_c, E, A\rangle$, která byla pronesena v situaci S_i (určenou externími indexy — points of reference — typickými pro S_i).

Jde-li nám o generování výrazů přirozeného jazyka, lze říci, že jazykový výraz E (tj. jeho úplná formální stavba) je generován současně dvěma nezávislými generátory — sémantickým a pragmatickým. Sémantický generátor O_c je pak formální zařízení vycházející z konceptuálního zápisu vět (tj. z jejich sémantické reprezentace) a poskytující relevantní sémantické údaje potřebné pro formální stavbu výrazu E. Pragmatický generátor poskytuje údaje o postojích uživatele jazyka ke konceptuálním jádrům (možným obsahům sdělení) a tyto údaje jsou rovněž relevantní pro sestavení jazykového výrazu E. Vedle vlastního sémantického generátoru O_c je důležitou složkou slovník V, který obsahuje údaje o sémanticko-syntaktických vlastnostech lexikálních jednotek a údaje o jejich dalších vlastnostech v podobě významových postulátů nebo posloupností sémantických rysů.

Postup generování vypadá schematicky takto:



Analýza představuje postup opačným směrem: na základě zadaného výrazu E přirozeného jazyka (věta, souvětí) se hledá odpovídající výraz v konceptuální notaci opět s použitím slovníku V, syntakticko-kombinatorických a pragmaticko-syntaktických tabulek. Sémantická složka je formulována tak (týká se jak syntézy tak analýzy), že bude možno získávat synonymní zápisy v konceptuální notaci, tj. pro dva výrazy E považované za synonymní bude možno získat v konceptuální notaci jeden zápis a naopak.

Výzkum popisovaný v článku je členěn na dvě etapy: v první se popisuje statický model (language "dead"), ve druhé se pak ukazuje přechod k modelu dynamickému (language "live"). Dále se počítá s propracováním statického modelu a jeho ověřením na samočinném počítači.