с окончателной оценкой необходимо подождать, пока не будут опубликованы все разделы работы. В любом случае, попытка Шаумяна и Соболевой - это свидетельство того, что поиски типа порождающей грамматики, применимой для языков, со свободным порядком слов, богатым словообразованием, какими являются слявянские языки, проблема очень актуальная.

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Haif Gaifman, Dependency Systems and Phrase Structure Systems, The Rand Corp. P-2315, Santa Monica, Calif. 1961, 64pp.

In the publication under review a formal model of a MT-oriented syntactic analysis (of Russian) is defined and its relation to various kinds of context-free grammars is investigated. Several reasons may be given to show the relevance of Gaifman's study : it iniciates contacts between algebraic and applied linguistics; the dependency conception (know from traditional descriptions of Slavonic languages) having been used in the procedure modelled (Rand Corp.[1]), contributes to the explicit formulation of this conception; and sets the problem of various kinds of weak equivalence of grammars (generative or recognition). We shall focus our attention 1) on the first part of Gaifman's work, culminating in Theorem 2.11 and 2) on the problem what components of the dependency conceptual scheme are mirrored in the model. In our presentation we take account of the formulations of Gaifman's results by Sh.A.Greibach [2] .

1.Definition_1. A dependency system (d-system) is an ordered quintuple $\langle M, M_o, T, P, L\rangle$ satisfying the condition: (1) M, M_o, T are non-empty finite sets, (2) $M_o \subset M$, (3) $M \cap T = \emptyset$ (4) P is a non-empty finite set of rules of the form

$$X(Y_1 \ldots Y_k \quad Y_{k+1} \ldots Y_n) \qquad (I)$$

where k and or n may be zero and $X, Y_i \in M$,

(5) L is a many-valued mapping from T onto M.

Intended interpretation: M - set of categories, M_o - set of sentence-like categories, T - set of words (word types), (I) reads: $Y_1, \ldots Y_n$ can"depend" on X in this order when X is to occupy the position of .

Definition_2. A d-system $\langle M, M_o, T, P, L\rangle$ accepts a string $a_1 \ldots a_m$ in T off there are Y_i, $1 \leq i \leq m$, $Y_i \in M$ such that L assigns Y_i to a_i and iff we can define on the A_i a two-place relation d with ancestral d^* which fulfills the following conditions:

(1) for no i, $A_i \, d^* A_i$

(2) for every A_i there is at most one A_j such that $A_i d A_j$.

(3) if $A_i d^* A_j$ and either $i < k < j$ or $i > k > j$, then $A_k d A_j$,

(4) d is a partial ordering with a unique upper bound,

(5) if $A_{i_1}, \ldots A_{i_p}$ are all the A_k for which $A_k dA_i$ and $i_1 < i_2 \ldots i_k < i \; < i_{k+1} \ldots < i_p$ (p may be zero), then $A_i (A_{i_1}, \ldots, A_{i_k} * A_{i_{k+1}}, \ldots, A_{i_p}) \in P$,

(6) the unique upper bound of (4) belongs to M_o.

Intended interpretation: L assigns A_i and A_j to a_i and a_j resp., and $A_i dA_j$ - $\langle a_i, A_i\rangle$ "depends on" or is "governed by",

$\langle a_j, A_j \rangle$.

In the theorem just to be quoted a special kind of context-free grammar is meant, namely the one with only rules of the form $X \to Y_1 \ldots Y_n$ and $X \to Z$, where X, Y_i belongs to a non-terminal vocabulary and Z to a terminal vocabulary (but without restriction on generality).

Theorem. For every d-system $\langle M, M_\bullet, T, P, L \rangle$ there is a context-free grammar $\langle I, T', X, P' \rangle$ generating all and only the strings accepted by the d-system, and moreover, there is a natural one-to-one correspondence between phrase-markers of strings of the context-free grammar and triples $\langle a, A, d \rangle$, where $a = a_1 \ldots a_m$ is an accepted string in T, $A = A_1 \ldots A_m$, $A_i \in L(a_i)$ and d is a binary relation defined on A and satisfying the conditions (1) - (6) of Definition 2.

Construction (without proof).

Given a d-system $\langle M, M_o, T, P, L \rangle$ put $T' = T$.

$\{W_i\} = \{Z_i : Z_i \in M$, there is no $x \in P$ such that $x = Z_i(Y_1 \ldots Y_k * Y_{k+1} \ldots Y_n)$ and no $n \geq 1$.

$\{V_j\} = M - \{W_i\}$. For each V_j create a new symbol V_j^W.

$$I = \{W_i\} \cup \{V_j\} \cup \{V_j^W\} \cup \{X\}$$

$$P' = \{\{V_j \to Y_1 \ldots Y_k V_j^W Y_{k+1} \ldots Y_n : V_j(Y_j \ldots Y_k \; Y_{k+1} \ldots \ldots Y_n) \in P\} \cup \{X \to Z : Z \in M_o\} \cup$$

$$\cup \{W_i \to Z : Z \in T \text{ and } W_i \in L(Z)\} \cup \{V_j^W \to Z : Z \in T \text{ and } V_j \in L(Z)\} \cup$$

$$\cup \{V_j \to Z : Z \in T,\ V_j \in L(Z) \text{ and } V_j(Y_1 \ldots Y_k * Y_{k+1} \ldots Y_n) \in P, \text{ where } n = \emptyset\}\}$$

Similar results were obtained at the same time and quite independently by S.Ja.Fitialov [3].

2. Turning to the second point we remark that every MT-oriented syntactic analysis of a language L is

necessarily a recognition procedure for a language L′, but $L \subseteq L'$. Nature and cardinality of $L' - L$ depends on several factors, e.g. existence and extension of syntactic homonymy of the sentences of L. In view of general features of the Rand Corp. system this means that given a d-system obtained from the Rand Corp. syntactic analysis of Russian and applying to it the procedure defined by Theorem 2.11 we get a context-free grammar not of Russian, but of a (rather large) extension of Russian. In order to obtain a d-system acceptiong all and only the grammatical sentences of Russian (more correctly, a subset of the set of all Russian Sentences satisfying the condition of "projectivity", viz. condition (3) of Definition 2), some relations in P must be formulated and restrictions laid down concerning application of the rules entering those relations in derivation of the sentences.

Leaving aside some minor issues, e.g. elements of "context-sensitiveness" in the traditional dependency scheme, we word the main problem. The conditions (1), (2) and (4) of Definition 2 can be restated as follows. $F = \langle \{A_i\}, d^{-1} \rangle$ is a rooted tree, where d^{-1} is the converse of d.Now, according to the traditional scheme the edges of F are labelled, i.e. several types of syntactic relations are distinguished, e.g. in a sentence $\langle NounAcc, VerbFin \rangle \in d$ may stay in an object or adverbiale relation, in other words, NounAcc may be an object or and adverbiale of VerbFin. Is it possible to reconstruct the notion of the types of syntactical relations by means of the notions already at hand? A definition and study of a function f that should provide "right" labels for edges of the rooted trees mentioned might be an approach to answering the question. What will be the arguments of f? Probably, relations defined in the set of the rooted trees associated with each of the grammatical sentences of a language. This would accord with the highly "transformational" nature of the old dependency conceptual framework.

References:

1. K.E.Harper and D.G.Hays, The use of machines in the construction of a grammar and computer program for structural analysis, in Proceedings of the International Congress on Information Processing, Paris 1959.
2. Sh.A.Greibach, Inverses of Phrase Structure Generators, Mathematical Linguistics and Machine Translation, Report NSF-11, The Computation Laboratory of Harvard University 1963, 3-3ff.
3. S.Ja.Fitialov, O modelirovanii sintaksisa v strukturnoj lingvistike in Problemy strukturnoj lingvistiky, Moscow 1962, 100ff.

P.Novák

E.Bach, Introduction to Transformational Grammars

The book under review is, as far as I know, the first systematical introduction into the extensive problematics of transformational grammars (TG).[1] According to the author's words, the contents of the book had been lectured at Texas University and discussed with many transformationalists,