

MT OPERATIONAL ANALYSIS

BY

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1.1 The MT Problem

Previous studies in machine translation at the University of Washington¹ were concerned chiefly with the compilation and organization of a Russian-English Operational MT Lexicon. This lexicographical work began in June of 1956 and consumed the better part of the time of the entire staff until June of 1959. The details and discussion of this work have already been recorded elsewhere² perhaps overzealously. The aims of this operational lexicon had best be restated here. They are twofold: 1) to test the feasibility of utilizing a) a word-for-word translation containing all absolutely necessary target-language alternatives of any given source-language semantic unit and b) a human post-editor; and 2) to provide a basic lexicon for a completely automatic translation system utilizing a comprehensive algorithm linking the grammars of Russian and English so as to furnish sentence-for-sentence translations without intervention of a human post-editor. At the time of this writing neither of these two aims has been realized.

The first has not been realized because there has not been time enough to set up the elaborate kind of test required but primarily because, once all possible lexicographical devices have been exploited, it is far more interesting and intellectually stimulating to seek a neat and completely automatic solution to the problem of MT. While the first report of the University of Washington Machine Translation Project included some apparently successful demonstrations of the operation of a post editor on UW word-for-word translations, there is absolutely no proof that a correct and reasonably facile reading of such a text could be attained in all cases. If he so desires, the reader himself may test the feasibility of the UW word-for-word translations by attempting to read any of the simulated machine translations included in this volume and representing a field of science with which he is familiar. It is imperative that the reader acquaint himself with the significance of the editorial symbols accompanying the lexical material of the output before making this test. For this reason the explanation of the editorial output symbols³ has been reprinted in this volume and directly precedes the simulated machine translations in the appendix to the Linguistic Analysis section.

The second aim of the Operational MT Lexicon has not been realized because of the tremendous implications in its attainment. Implicit in this aim is the actual solution of the MT problem. It will be instructive to characterize the MT problem, at least as it is viewed by the UW group after three years of fairly sustained project efforts, in order to evaluate properly the Operational Lexicon and subsequent work.

The MT problem appears to have six extensive facets: 1) exhaustive specification of the grammar (esp. syntax) of the source language; 2) exhaustive specification of the grammar of the target language; 3) complete correlation between these two specifications; 4) an exhaustive specification of meaning in the source language according to some semantic theory or some master schematization of semantic relationships and based on the specification of the grammar; 5) an exhaustive specification of meaning in the target language likewise based on its grammar; 6) a complete correlation between these two semantic specifications.

It seems reasonable to suppose that an ideal MT system would isolate and attempt to solve the above-mentioned six facets of the MT problem. The solution of these problems, even working out the details of the procedure involved in the solution, involves an untold amount of data-gathering and careful interpretation of the data in terms of a powerful syntactic theory. Because MT has always been associated with a very practical aim, viz., rendering readily accessible the scientific literature in other languages, most investigators have felt that various empirical approaches usually entail the use of continually expanding corpus of scientific literature, the compilation of a bilingual lexicon on the basis of the corpus, and the elaboration of a continually expanding and developing algorithm effecting translation of the corpus and based on the constructs discovered within the corpus. It seems that such methodology can be criticized on two counts. First, they seem to be predicated on the intuitive assumption that the sentences of scientific material differ in some nontrivial way from the sentences of nontechnical material. This is certainly true in respect to semantic content, but we are not yet prepared to investigate this aspect of language. We are still lacking a semantic

¹ See Linguistic and Engineering Studies in Automatic Language Translation, Department of Far Eastern and Slavic Languages and Literature and Department of Electrical Engineering. The University of Washington, Seattle, 1958.

² Op. cit., Micklesen, Lew R., Procedural Report.

³ Op. cit., Procedural Report, Section 12.2

theory to aid in accounting for the data. Furthermore, before serious study of this vast area can be initiated, it is imperative that it be exactly delimited by an all-inclusive formulation of the grammar. While it is true that our intuitions about language may not always be correct, they are frequently interesting enough to evoke careful investigation. However, even though we may intuitively feel that even the grammar of scientific literature is somehow different, the sentences in a scientific text surely are just as extensive and complex as those even in general literature. It would be indeed surprising if a serious investigation refuted this statement. The second criticism is leveled against the assumption that a continually expanding corpus will eventually discover all of the grammar necessary for the automatic translation of scientific literature. Such corpora can be invaluable as a testing ground for grammatical formulations and undoubtedly may be useful in semantic investigations; but, even if almost indefinitely extended and minutely described, they could never lead to the construction of an all-inclusive grammar. Just such a grammar is essential to the recognition of the structure of source-language sentences, one of the fundamental steps in any system for automatic language translation.

This discussion leads next to an evaluation of the principal product of the research effort of the University of Washington group, the Russian-English MT Operational Lexicon, in terms of the above-mentioned component parts of a so-called ideal MT system. The Operational Lexicon represents a minimum correlation-specification between the grammatical and semantic systems of Russian and English, i.e., it is a partial representation of parts 3 and 6 in the above ideal MT system. The word "minimum" is a key word in this definition and requires explanation. This can best be done by considering one of the entries from the lexicon. The entry selected has the Russian part "ВЗМЕНИИ" and the English part "(of)change(s)." The phrase "minimum correlation-specification" in terms of grammar means that there is no indication of when the constituent structure of any given Russian sentence may demand the English counterparts "of change," "change," or "changes." Furthermore, even other English renditions may be required by certain syntactic structures. The phrase "minimum correlation-specification" in terms of semantics means that there is no indication of when English alternatives such as "modification, alteration, variation, conversion, transformation," may be demanded in a given sentence. In other words, the English equivalents were assigned to the Russian forms on the basis of a partial consideration of syntactic environments, i.e., the most frequent and immediate environments and on the basis of an arbitrary selection of a minimal number of semantic alternatives suggestive of those not chosen. This characterization needs only the additional statement that the lexicon contains also partial consideration of immediate semantic environments. This was attained by including in the lexicon idioms consisting of immediate constituents. Noteworthy among the idioms are the so-called "pseudoidiomatic sequences."⁴ Only partial but adequate consideration was given to syntactic and semantic environments in order to reduce the clutter in a word-for-word translation and yet produce accurate and intelligible translations. But even with this arbitrarily reduced consideration of syntactic and semantic environments and in the absence of logical processing based on a complete consideration of syntactic environments at least, the clutter of superfluous alternatives in the output often seriously reduces speed of comprehension and occasionally leaves certain passages obscure. Even when all superfluous alternatives are removed by a human post-editor, the resulting translation is always unconventional.⁵ As previously stated, whether partial specification of syntax and semantics is always adequate i.e., always yields accurate and intelligible translations, has yet to be decisively proved.

The next question to arise is whether such reduced or condensed correlation-specifications are practicable in MT research. Our experience shows that the labeling cannot be so facile. Actually there are two sides to the answer to the problem: a syntactic and a semantic. Let us first consider the syntactic side. Any one of the simulated machine translations will reveal a great number and variety of syntactic ambiguities. The problem would seem to devolve into merely devising routines for elimination of the ambiguities. This kind of activity has been sampled. At the outset a finite number of more or less trivial tests necessarily limited in range of context proved to be eminently successful in removing a significant percentage of ambiguities upon application to several text passages.⁶ But it was immediately evident that these tests were inadequate to solve the ambiguities concerned in all instances. If all types of ambiguities capable of solution on a grammatical basis were to be successfully dealt with, an extremely powerful grammar of the source language would have to be elaborated. The tests conducted also revealed that further research is necessary in order to achieve distinctive solutions for the grammatical and semantic ambiguities still blurring the meaning of the output. It appears that only an all-inclusive grammar would delimit these two aspects of language. If an exhaustive grammatical analysis is essential to pinpointing the grammatical status of constituent forms of source-language sentences, there seems to be little rationale and little interest in linking an elaborate analysis of the source language with only a partial analysis of the target language. The linkages could be established and might prove useful for interim translation, but they themselves would not be simple and would involve much work in an area inevitably slated for refinement. It is very likely that such a partial grammar of the target language would have to be refined on the spot, i.e., during establishment of the linkages, in order to avoid highly probable ambiguities and to render adequately any discontinuous constructs. From the standpoint of grammar, at least, such condensed correlation-specifications are definitely contraindicated.

The semantic aspect of condensed correlation-specifications is at once simpler and more complex than the syntactic. In other words, the problem of meaning is so complex that it may be advisable to reduce arti-

⁴ Op. cit., Procedural Report, Section 2.3 and 10.3.

⁵ Op. cit., Procedural Report, Section 10.4.

⁶ See Micklesen and Wall, Logical Programming Research in the University of Washington Machine Translation Project, Engineering Analysis, Appendix II, of the present report.

ficially its dimensions by a careful choice of target alternatives, analyze completely the grammar, and use the results of this analysis to investigate empirically by machine the nature of meaning. Unfortunately, this artificial reduction of the semantic problem may tend to obscure just the relationships under investigation. If there existed a more or less clearly defined approach to meaning, it could be nicely exploited. Since, however, nothing of the sort exists, since a syntactic analysis has priority, and since the degree of interdependence, if any, between syntax and meaning has yet to be determined, it would seem reasonable to utilize an artificially reduced correlation-specification for meaning to allow research to proceed and perhaps to produce useful translations in the course of MT research. There is a good case for this type of correlation-specification.

1.2 The Syntactic Probe

The preceding section represents to a great extent the reasoning involved in a complete re-evaluation of work accomplished at a very critical date in the course of MT research at the University of Washington. This critical date was the completion of the supplementation work⁷ which yielded the present MT Operational Lexicon of over 170,000 semantic units. The operation of supplementation proved to be much more complex, especially in the work on the verb forms and in the work of checking and rechecking the lexicon, than it had originally seemed. This type of work consumed an inordinate amount of time, particularly when the staff was employed half-time during the academic year. The work of supplementation was actually begun in March 1957, was temporarily interrupted by the preparation of the first formal report of the UW Machine Translation Project, and was completed only in June of 1959. The completion of the work of supplementation is viewed as critical because it marks the end of emphasis on lexicographical studies and signals the beginning of serious syntactic studies. Recognition of the seriousness of the syntactic problem led then to the reevaluation of the MT Operational Lexicon and the entire MT problem in order to determine the optimal approach to syntax. A careful review of the literature combined with close analysis of the ideas therein strongly indicated to workers in the UW Project, at least, that the principles of transformational grammar⁸, particularly as embodied in the theory of grammar as expounded by Noam Chomsky, seemed to provide the kind of approach necessary for the construction of an elaborate grammar. The theory of transformational grammar has not yet been completely tested; its principles have not yet been applied systematically to all the syntactic data of any one natural language. There are yet many problems to be worked out. Even with complete formulation and corroboration of the principles of transformational grammar, their application to the Russian language would have been a far from simple procedure. In the absence of this formulation and corroboration, the work of applying transformational grammar to Russian would have been highly interesting and challenging but inconclusive in view of the critical time factor leaving, for all practical purposes, only the summer months for any real effort. The relatively short summer period combined with proper research procedure committed solely to the utilization of transformational grammar would have yielded at best a solid foundation but would have only initiated the long process of analysis. To be sure, only a fool would deprecate the laying of a solid foundation upon which to pursue further research, but at the time the thinking of the project staff was not well crystallized in regards to transformational grammar. In view of the various considerations outlined above it was decided to effect what may be called a partial application of some of the principles of transformational grammar to the Russian language in an attempt to acquire at least some idea of its effectiveness in MT research. In addition, linking the data thus obtained with the previous lexicographical work of the project was considered at this stage of MT research to be a highly desirable part of this exploratory syntactic operation. This work was suggested in part by the also partial but very interesting application of transformational grammar to a study of the syntax of the instrumental case in Russian by Dean Worth.⁹ In fact, the results of his study were utilized completely in gathering the data to be presented below. The data was collected on the basis of the syntactic behavior of verbs as pivotal elements in the phrase structure of most sentences, as syntactically complex elements, and as elements frequently associated with multiple meanings. A total of 240 verbs (perfective and imperfective verbs were counted as one) were processed in this study. These verbs were taken from the original corpus of the UW project and represent all such verbs in alphabetical listing from Russian letters а through з. For this study practically all possible basic sentence types in which primarily finite verbs may occur were compiled. No attempt was made to indicate any transformational hierarchy or even to indicate the nature of the transformations. There has simply been no attempt to evaluate properly the data in terms of the theory of transformational grammar. Each verb in turn was tested within the framework of all the basic sentence types. Whenever a given sentence type was found permissible for a given verb, then additional grammatical information was developed for all or most constituent elements of the phrase structure of the sentence under consideration. During the course of the data gathering, a certain amount of analysis was effected, particularly in respect to the subcategories of basic phrase structures. The subcategories were all established on the basis of transformations of parts of the basic phrase structure. The 240 verbs processed permitted corroboration of most of the transformations, but since there was no time for a really critical re-examination of the validity of the subcategories and for establishing the transformational relationship among all the so-called basic phrase structures, and certainly no time nor sufficient data for a proper transforma-

⁷ See op. cit., Procedural Report, Section 7.0.

⁸ See Noam Chomsky, Syntactic Structures, The Hague (1957), pp. 77ff., and Zellig S. Harris, Co-occurrence and Transformation in Linguistic Structure, LANGUAGE 33.283-240, (1957).

⁹ Dean Stoddard Worth, Transform Analysis of Russian Instrumental Constructions, WORD, Vol. 14, No. 2-3 August-December, 1958.

tional analysis of Russian, actual examples were collected for each verb wherever subcategories were suspected. Time and space do not permit the proper presentation of all the data gathered; therefore only 4 verbs, considered syntactically interesting, were selected for illustration of this method of data gathering.

Abbreviations¹⁰ are used for the constituent elements of each basic phrase structure. The following list explains each of these abbreviations:

Upper-case S = substantive
Upper-case V = finite verb
Upper-case A = adjective
Upper-case Q = adverb
Upper-case I = infinitive
Upper-case P = participle
Upper-case G = gerund
Lower-case p = preposition
Superscript numberal = enumeration of the substantives in a given basic phrase structure.
Subscript n = nominative case
Subscript a = accusative case
Subscript g = genitive case
Subscript d = dative case
Subscript i = instrumental case
Subscript x = any case
Subscript r = reflexive
Subscript neg = negative

The other abbreviations used in the presentation of the data should be self-explanatory. The data collected for each constituent element of a given basic phrase structure give all its indicated features without consideration of the co-occurring features of the other constituents. Isolation of the various patterns of co-occurring features belonging to two or more of the constituent elements of a basic phrase structure would have been a task of tremendous proportions and displaying such complex information would have been almost impossible. Besides, there is as yet no indication that patterns of such complexity need be recognized.

The following pages list the 240 verbs processed for syntactic data and illustrate the kind of data gathered. In the section presenting the data, only the first page seeks the existence or nonexistence of certain inflectional forms of each verb. The remaining pages test for existence or nonexistence of various basic phrase structures. If a given basic phrase structure exists, then it is tested transformationally for subtypes. Lastly, the basic phrase structure or its subtypes are tested constituent by constituent for the presence or absence of the indicated features.

1.3 Complete List of Verbs Processed

1. абсорбировать	21. вводить	*38. включать	54. вооружать
2. адсорбировать	ввести	включить	вооружить
3. анализировать	22. вворачивать	*39. владеть	55. воплощать
4. ассимилировать	вворотить	40. влиять	воплотить
5. базировать	23. вдавливать	повлиять	воскликовать
6. балансировать	вдавить	*41. вносить	воскликнуть
7. бегать	24. велеть	внести	*57. воспламенять
бежать	25. верить	вовлекать	воспламенить
*8. беспокоить	*26. вертеть	вовлечь	58. воспользоваться
побеспокоить	27. ветвиться	*43. водить	*59. воспринимать
обеспокоить	28. взаимодействовать	вести	воспринять
*9. быть	*29. вззвешивать	44. воевать	60. воспроизводить
10. блестеть	взвесить	45. возбуждать	воспроизвести
блеснуть	30. взглянуть	возбудить	*61. восстанавливать
11. бормотать	взглядывать	*46. воозвращать	восстановить
пробормотать	31. взыхать	возвратить	*62. владать
12. бороться	вздохнуть	вернуть	власть
13. бояться	*32. взрывать	47. возвращать	63. впускатъ
*14. брать	взорвать	возвысить	впустить
взять	*33. взрывать	48. воздействовать	*64. вращать
*15. бродить	взрять	49. возить	*65. всасывать
брести	34. взрыхлять	везти	всосать
*16. бросать	взрыхлить	50. возмущать	66. вскачивать
бросить	35. видать	возмутить	вскочить
17. вальшовать	видеть	51. возникать	*67. вскрывать
проводальшовать	увидеть	возникнуть	вскрыть
18. валять	36. висеть	52. возрастать	68. всплыть
варирировать	37. вкладывать	возрасти	всплыть
20. ввинчивать	вложить	53. волновать	*69. вспоминать
винтить		взволновать	вспомнить

* These verbs have multiple English alternatives.

¹⁰ Most of the abbreviations utilized here follow Dean Worth's system.

70. вставать	105. вырастать	145. длить	185. задевывать
встать	вырасти	продлить	заделать
71. вставлять	*106. вырезать	146. добавлять	*186. задерживать
вставить	вырезать	*147. добивать	задержать
*72. встречать	*107. вырывать	добить	задумывать
встретить	вырвать	*148. доводить	задумать
73. вступать	*108. вырывать	довести	заземлять
вступить	вырвать	149. доказывать	заземлить
74. втягивать	*109. высаживать	доказать	189. заимствовать
втянуть	высадить	*150. докрашивать	позаимствовать
75. входить	*110. высаживать	докрасить	*190. заканчивать
войти	высадить	151. допускать	закончить
76. въезжать	111. высказывать	допустить	*191. закладывать
въехать	высказывать	152. дорастать	заложить
*77. выбрасывать	112. высказывать	дорости	*192. заключать
выбросить	выскочить	*153. доставать	заключить
*78. выверять	*113. выслушивать	достать	*193. закреплять
выверить	выслушать	*154. доставлять	закрепить
*79. выводить	*114. высовывать	доставить	194. закруглять
вывести	высунуть	*155. достигать	закруглить
*80. выгорать	*115. выступать	достичь	195. закрывать
выгореть	выступить	*156. достраивать	закрыть
81. выгружать	*116. высыпать	достроить	196. заливать
выгрузить	высыпать	*157. доходить	*197. замедлять
*82. выдавать	117. высыхать	дойти	замедлить
выдать	высохнуть	*158. драть	198. заменять
*83. выдвигать	*118. вытекать	подрать	заменить
выдвинуть	вытечь	159. дремать	199. замерять
*84. выделять	*119. вытягивать	*160. дробить	замерить
выделить	вытянуть	*161. дрожать	200. замечать
*85. выдерживать	*120. выходить	раздробить	*205. заметить
выдержать	выйти	*162. дублировать	201. замешать
*86. выдувать	121. вычислять	*163. думать	заметить
выдуть	вычислить	*164. дуть	*202. замыкать
87. выезжать	122. выявлять	165. дышать	замкнуть
выехать	выявить	166. ездить	замолкать
88. выздоровливать	*123. выяснять	ехать	замолкнуть
выздороветь	выяснить	*167. есть	*204. замораживать
*89. вызывать	124. гарантировать	сесть	заморозить
вызвать	125. глотать	168. жалеть	*205. замуровывать
*90. выключать	126.глядеть	пожалеть	замурововать
выключить	поглядеть	169. жаловать	*206. занимать
91. выколачиваться	*127. гнездиться	пожаловать	занять
выколоситься	*128. говорить	170. ждать	*207. заносить
92. выкраивать	сказать	171. женить	занести
выкроить	129. гордиться	172. жить	208. заострять
93. вылетать	*130. гореть	*173. забивать	*209. записывать
вылететь	*131. господствовать	забить	записать
94. вынимать	*132. готовить	174. забирать	*210. заплыть
вынуть	приготовить	забрать	заплыть
*95. выносить	133. грозить	175. заботить	211. заполнять
вынести	пригрозить	176. завершать	заполнить
96. вынуждать	134. грубить	закончить	212. запрессовывать
вынудить	огрубить	177. зависеть	запрессовать
97. выпадать	135. гулять	*178. заводить	*213. запутывать
выпасть	погулять	завести	запутать
98. выпивать	*136. двигать	*179. завязывать	214. зарегистрировать
выпить	двинуть	заязывать	215. зарождать
*99. выписывать	137. дезорганизовать	заязывать	зародить
100. выполнять	*138. действовать	180. заглядывать	216. засасывать
выполнить	подействовать	заглянуть	засосать
*101. выпускать	*139. делать	*181. заговоривать	217. засевать
выпустить	сделать	заговорить	засеять
*102. вырабатывать	*140. делить	182. загорать	218. засмеивать
выработать	делить	загореть	засмеять
*103. выравнивать	141. демаскировать	183. загружать	219. засорять
выровнять	142. депримировать	загрузить	засорить
*104. выражать	143. держать	184. задавать	
выразить	144. дифрагмировать	задать	

*220. засыпать	225. затруднить	230. заливать	235. звенеть
заснуть	затруднить	зашить	236. звучать
*221. засыпать	*226. затухать	зашемлять	просвучать
засыпать	затухнуть	зашемить	237. зимовать
222. засыхать	*227. затачивать	защищать	прозимовать
засохнуть	затянуть	защитить	238. знакомить
223. затмевать	*228. захватывать	заявлять	познакомить
затмить	захватить	заявить	239. знаменовать
224. затрачивать	*229. заходить	звать	240. знать
затратить	зайти	позвать	

1.4 Illustration of the Syntactic Data Gathered

		доска		доски		бумага		бумаги		заяц	
		Pres	Past	Pres	Past	Pres	Past	Pres	Past	Pres	Past
G	[Pres Past]	X		X		X		X		X	
Gr	[Pres Past]	X	X					X		X	X
P	[Pres Past] [act pass]	X	X			X		X	X	X	X
	[Past Pres] [act pass]	X	X	X	X			X	X	X	X
Pr	[Pres Past]	X	X					X	X	X	X
I		X	X	X	X	X	X	X	X	X	X
I _r		X	X					X		X	X

		просить			вырастать			достигать			захватывать		
		an	inan		an	inan		an	inan		an	inan	
		sg	pl		sg	pl		sg	pl		sg	pl	
		phon	1		phon	1		phon	1		phon	1	
		non-phon	2		non-phon	2		non-phon	2		non-phon	2	
			3										
S_nV													
S _{n'}													
V		Pres											
past													
V _{imp}		pos			X			X					
neg					X								
V _{1pl}		pos				X		X					
neg						X		X					
V _{3pl}													
V ₀ = [pres past]													
S_nV_d													
S _{n'}													
V _r = [pres past]													
V _{imp} { pos neg }													
V _{r 3pl} { pos neg }													
V _{r 3pl}													
V _{r 0} = [pres past]													

$S_n^1 = \boxed{S_n QV}$				
$S_n^1 =$	an inan sg pl pron 1 2 3 non-pron	x x	збочатъ збочутъ	
$V = \boxed{\text{pres past}}$		x x x x x x x x x x x x x x x x	збрастатъ збрастутъ	
$S_n^1 = \emptyset$	$V_{imp} = \boxed{\text{pos neg}}$ $V_{ipf} = \boxed{\text{pos neg}}$ V_{3pl}	x x		
$V_\phi = \boxed{\text{pres past}}$				
$S_n^1 = \boxed{S_n QV_r}$				
$S_n^1 =$	an inan sg pl pron 1 2 3 non-pron	x x		
$V_r = \boxed{\text{pres past}}$		x x x x x x x x x x x x x x x x		
$S_n^1 = \emptyset$	$V_{imp} = \boxed{\text{pos neg}}$ $V_{ipf} = \boxed{\text{pos neg}}$ V_{3pl}	x x		
$V_{\phi r} = \boxed{\text{pres past}}$				

ОН ВЫРОС ИЗ ПАЛЬТО

ОН ВЫРОС В ХУРННОГО

$S'_h V_p S^2_x$	бросать	бросить	вырастать	вырастил	вырастай	вырасли	догнать	достигнув	захватывать	захватил
$S'_h = \begin{bmatrix} an \\ inan \\ sg \\ pl \\ pron \\ 1 \\ 2 \\ 3 \\ \text{пол.pron} \end{bmatrix}$	X X	X X	X X	X X	X X	X X	X X	X X	-	-
$V = \begin{bmatrix} pres \\ past \end{bmatrix}$	X X	X X	X X	X X	X X	X X	X X	X X	-	-
$S'_{h\phi} = \begin{bmatrix} Vimp \\ neg \\ Vip1 \\ pos \\ V3pl \end{bmatrix}$	X X	X X	X X	X X	X X	X X	X X	X X	-	-
$V_\emptyset = \begin{bmatrix} pres \\ past \end{bmatrix}$	-	-	-	-	-	-	-	-	-	-
$S^2_x = \begin{bmatrix} an \\ inan \\ sg \\ pl \\ pron \\ 1 \\ 2 \\ 3 \\ \text{пол.pron} \end{bmatrix}$	X X	X X	X X	X X	X X	X X	X X	X X	-	-
$PX = \begin{bmatrix} G \\ D \\ A \\ I \\ L \end{bmatrix}$	B B	из из	до до	-	-	-	-	-	-	-

		бросать		захватывать		захватить	
		захватывать		захватить			
		захватывать		захватить			
$S_n^1 =$	$\begin{bmatrix} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{3} \\ \text{non-pron} \end{bmatrix}$	x	x	x	x	x	x
$V =$	$\begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$	x	x	x	x	x	x
$S_n^0 = \emptyset$	$\begin{bmatrix} V_{imp} \\ \text{neg} \end{bmatrix}$	x	x	x	x	x	x
	$V_{pl} = \begin{bmatrix} \text{pos} \\ \text{neg} \end{bmatrix}$	x	x	x	x	x	x
	V_{3pl}	x					
	$V_{ps} = \begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$						
$S_x^2 =$	$\begin{bmatrix} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{3} \\ \text{non-pron} \end{bmatrix}$	x	x	x	x	x	x
$P_x =$	$\begin{bmatrix} G \\ D \\ A \\ I \\ L \end{bmatrix}$	x	x	x	x	x	x

$S_n^1 =$	$S_n^1 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^2 =$	$S_n^2 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^3 =$	$S_n^3 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^4 =$	$S_n^4 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^5 =$	$S_n^5 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^6 =$	$S_n^6 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^7 =$	$S_n^7 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^8 =$	$S_n^8 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^9 =$	$S_n^9 V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ
$S_n^{10} =$	$S_n^{10} V, 4TC$	$V_n = [\begin{matrix} pres \\ past \end{matrix}]$	досуг досуг	БУДЬТЕ БУДЬТЕ	ЗАХОДЫ ЗАХОДЫ

S_n^VII	an inan sg pl pron 2 3 non-pron	x x x x x x x	x x x x x x x	spacato dissociață	SPACATO DISSOCIAȚĂ	ROCHITATĂ ROCHINHITĂ	ROCHITATĂ/ROCHINHITĂ
$V = [prespast]$		x x	x x				
S_n^{VII}	Vimp. Vipt. V3P1	pos neg pos neg pos neg	x x x x x x				
V_3	$V_3 = [prespast]$	x x	x x				
S_n^VrI	an inan sg pl pron 2 3 non-pron	x x x x x x x	x x x x x x x				
$V_r = [prespast]$		x x	x x				
S_n^{VrI}	Vimp. Vipt. V3P1	pos neg pos neg pos neg	x x x x x x				
V_{Nr}	$V_{Nr} = [prespast]$	x x	x x				

$S_n^1 \cup S_a^2$	договоры	послания	заявления	запросы	заказы
$S_n^1 =$	[an inan [sg pl [pron [1 [2 [3 non-pron]	x x x x x x x x x x x x			
$V =$	[pres past]	x x x x			x x x x
$S_h^1 \cup S_h^2$	[Vimp Vimp Vimp V3pl]	x x x x x x x x			x x
$V_{10} =$	[pres past]	x x x x			x x x x
$S_a^2 =$	[an inan [sg pl [pron [1 [2 [3 non-pron]	x x x x x x x x x x x x			

$S_n^1 =$	$ S_n^1 V_n S_a^2 $	[an inan [sg pl pron- non-phon	X X X X X X X X X X X X	свистать свисти	
$V_n =$	$ prespast $	X X		восторгаться восторгнить	
$S_a^2 =$	$ V_{imp}^1 $ $ V_{imp}^2 $ $ V_{3pl} $	[pos neg [pos neg V _{3pl}			
$V_{pos} =$	$ prespast $				
$S_a^2 =$	$ aninan[sgplpron-non-phon $	X X X X X X X X X X X X			

$S^n VS^2_a p S^3_x$	can inan	sg pl	' 2 3	non-phon	phon	spocute	associata	reactiva	receptiva	receptiva
$S'_n =$	x	x	x	x	x	x	x	x	x	x
$V =$ [pres past]	x	x	x	x	x	x	x	x	x	x
$S'_n = \emptyset$ $V_{imp} =$ [pos neg] $V_{imp} =$ [pos neg] V_{3pt}	x	x	x	x	x	x	x	x	x	x
$V_p =$ [pres past]	x	x	x	x	x	x	x	x	x	x
$S^2_a =$	x	x	x	x	x	x	x	x	x	x
$S^3_x =$	x	x	x	x	x	x	x	x	x	x
$PX =$ [G D A T I]	x	x	x	x	x	и3	и0	и	и	и

		дома	на работе	в университете	в магазине	на прогулке	на концерте	на выставке	на фестивале
		дома	на работе	в университете	в магазине	на прогулке	на концерте	на выставке	на фестивале
$S_n' =$	<ul style="list-style-type: none"> [an] <ul style="list-style-type: none"> inan [sg] <ul style="list-style-type: none"> -pl [pron] <ul style="list-style-type: none"> ' -2 -3 non-pron 	x	x						
$V_t =$	<ul style="list-style-type: none"> [pres] [past] 	x	x						
$S_{n\alpha}' =$	<ul style="list-style-type: none"> $V_{t\text{imp}} =$ <ul style="list-style-type: none"> [pos] [neg] $V_{t\text{imp}} =$ <ul style="list-style-type: none"> [pos] [neg] V_{3PI} 	x	x						
$V_{t\emptyset} =$	<ul style="list-style-type: none"> [pres] [past] 					x			
$S_\alpha^a =$	<ul style="list-style-type: none"> [an] <ul style="list-style-type: none"> inan [sg] <ul style="list-style-type: none"> -pl [pron] <ul style="list-style-type: none"> ' -2 -3 non-pron 	x	x						
$S_x^3 =$	<ul style="list-style-type: none"> [an] <ul style="list-style-type: none"> inan [sg] <ul style="list-style-type: none"> -pl [pron] <ul style="list-style-type: none"> ' -2 -3 non-pron 	x	x	x	x	x	x	x	x
$P_x =$	<ul style="list-style-type: none"> G D A H F 	x	x	x	x	x	x	x	x

$S^1_{VS^2}$	спосаб	спосиць	вираскт	вирасти	вочинкт	вочинити
$S^1 = \begin{cases} \text{an} \\ \text{-an} \\ \text{sg} \\ \text{-pl} \\ \text{pron} \\ \text{1} \\ \text{2} \\ \text{3} \\ \text{non-pron} \end{cases}$						
$V = \begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$						
$S^1_{V^{\text{imp}}}$ $V^{\text{imp}} = \begin{bmatrix} \text{pos} \\ \text{neg} \end{bmatrix}$ $S^1_{V^{\text{imp}}} = \begin{bmatrix} \text{pos} \\ \text{neg} \end{bmatrix}$ $V^{\text{imp}}_{3\text{pl}}$						
$V^{\text{imp}} = \begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$						
$S^2_{VS^2}$						

$S^1 \vee r S^2_a I$	бросать	бросить	выпрыгнуть	выпрыгнуть	захватить	захваты
$S^1 =$						
	[an inan]					
	[sg pl]					
	pron [2 3] non-pron					
$V_r =$	[pres past]					
$S^{1,ord}_n$						
	V_{imp} [pos neg]					
	V_{imp} [pos neg] V_{sp}					
$V_{sp} =$	[pres past]					
$S^2_a =$						
	[an inan]					
	[sg pl]					
	pron [2 3] non-pron					

<u>Sh VS_a S_b</u>	<u>БРОКАТЬ</u>	<u>БУРДАТЬ</u>	<u>БУРДИТЬ</u>								
$S_h =$	[on] inan [sg] [pl]	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x
	[pron] [1] [2] [3]	x x x	x x x	x x x	x x x	x x x	x x x	x x x	x x x	x x x	x x x
	non-pron	x	x	x	x	x	x	x	x	x	x
$V =$	[pres] [past]	x									
		x									
S_{imp}	$V_{imp} =$ [pos] neg	x									
	$V_{imp} =$ [pos] neg	x									
	V_{3pl}	x									
$V_0 =$	[pres] [exist]	x									
	x										
$S_a^2 =$	[on] inan [sg] [pl]	x									
	[pron] [1] [2] [3]	x									
	non-pron	x									
$S_a^3 =$	[on] inan [sg] [pl]	x									
	[pron] [1] [2] [3]	x									
	non-pron	x									

		он захватил сахару				
		он бросил песку	бросить	вырастить	постигнуть	захватывать
$S_n^1 =$	$[S_n^1 V S_g^2]$	x x			x x	x x
	[an inan [sg pl pron [1 2 3 non-pron]]]	x x			x x	x x
$V =$	[pres past]	x x		x x	x x	x x
$S_n^1 = \emptyset$	$V_{imp} = [posneg]$	x x		x x	x x	x x
	$V_{1pl} = [posneg]$	x x		x x	x x	x x
	V_{3pl}	x x		x x	x x	x x
$V_\beta =$	[pres past]					
$S_g^2 =$	[an inan [sg pl pron [1 2 3 non-pron]]]	x x		x x	x x	x x

$S_h V_r S_g$						
$S'_h =$	an inan [sg pl] pron [1 2 3] non-pron		послать посыпать			
$V_r =$	[pres past]		вырастить вырасти			
$S'_n = \emptyset$	$V_{imp} = [posneg]$ $V_{rpl} = [posneg]$ V_{3pl}			достигать достичь		
$V_{t\emptyset} = [prespast]$						
$S_g^2 =$	an inan [sg pl] pron [1 2 3] non-pron					

		S _n V _{Sg} ²		S _n '		S _n ''		S _n ^a	
		S _n V _{Sg} ²		S _n '		S _n ''		S _n ^a	
		S _n V _{Sg} ²		S _n '		S _n ''		S _n ^a	
		on non		x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x
		sg pl		x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x
		pron 2 3		x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x
		non-phon		x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x
		V _{neg} = [pres past]		x x		x x		x x	
				x x		x x		x x	
		S _n ' = [V _{neg} imp V _{neg} imp V _{3pl}]		x x				x x	
				x x				x x	
						x x		x x	
		V _{neg} Ø = [pres past]		x x				x x	
				x x				x x	
		S _n ^a = [on non sg pl pron 2 3 non-phon option oblig]		x x		x x x x x x		x x x x x x	
				x x		x x x x x x		x x x x x x	
				x x		x x x x x x		x x x x x x	
				x x		x x x x x x		x x x x x x	
				FS	FS	x x x x x x		x x x x x x	
				FS	FS	x x x x x x		x x x x x x	
				x x	x x	x x x x x x		x x x x x x	

		он бросил песку в мешок					он захватил сахару с собой				
$S_n^1 V S_g^2 p S_x^3$		бросил	бросить	выпакать	выпакать	достигнуть	достичь	захватить	захватить	захватить	захватить
$S_n^1 =$	[an inan sg pl pron-1 pron-2 pron-3 non-pron]	x	x				x	x		x	x
$V =$	[pres past]	x	x			x	x		x	x	
$S_{n^{\neg\phi}}^1 =$	[Vimp neg Vipl = [pos neg V3pl]]	x	x			x	x		x	x	
$V_\emptyset =$	[pres past]										
$S_g^2 =$	[an inan sg pl pron-1 pron-2 pron-3 non-pron]	x	x			x	x		x	x	
$S_x^3 =$	[G D A I L]	x	x			x	x		x	x	
$P_x =$						x	x		x	x	

<u>ShVrSg_pSx³</u>	<u>EROGATIS</u>	<u>6720Cn7b</u>	<u>DEMESETIS</u>	<u>EROGATIS</u>	<u>6720Cn7b</u>
$Sh = \begin{bmatrix} \text{[P]} \\ \text{[SG]} \\ \text{[PL]} \\ \text{[pron]} \\ \text{[1]} \\ \text{[2]} \\ \text{[3]} \\ \text{[non-pron]} \end{bmatrix}$					
$Vr = \begin{bmatrix} \text{[PRES]} \\ \text{[PAST]} \end{bmatrix}$					
$S_{\text{imp}} = \begin{bmatrix} \text{[V, imp]} \\ \text{[POS]} \\ \text{[NEG]} \end{bmatrix}$					
$S_{\text{imp}} = \begin{bmatrix} \text{[V, imp]} \\ \text{[POS]} \\ \text{[NEG]} \end{bmatrix}$					
$V_{\text{3PL}} = \begin{bmatrix} \text{[PRES]} \\ \text{[PAST]} \end{bmatrix}$					
$Sg^2 = \begin{bmatrix} \text{[ON]} \\ \text{[INCN]} \\ \text{[SG]} \\ \text{[PL]} \\ \text{[pron]} \\ \text{[1]} \\ \text{[2]} \\ \text{[3]} \\ \text{[non-pron]} \end{bmatrix}$					
$Sg^3 = \begin{bmatrix} \text{[ON]} \\ \text{[INCN]} \\ \text{[SG]} \\ \text{[PL]} \\ \text{[pron]} \\ \text{[1]} \\ \text{[2]} \\ \text{[3]} \\ \text{[non-pron]} \end{bmatrix}$					
$Px = \begin{bmatrix} \text{[G]} \\ \text{[O]} \\ \text{[A]} \\ \text{[F]} \\ \text{[H]} \end{bmatrix}$					

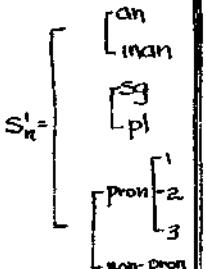
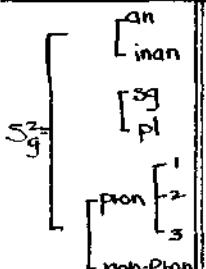
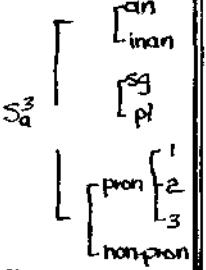
$ ShVS_g^e $	Spocats Spocnts	Beractat ^e Beractin	Socurata ^e Socurhyt ^e	Zaxestat ^e Zaxestin ^e
$S_n^1 =$ $\begin{bmatrix} \text{an} \\ \text{inan} \end{bmatrix}$ $\begin{bmatrix} \text{sg} \\ \text{pl} \end{bmatrix}$ $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ non-pron				
$V = \begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$				
$S_n^{1+0} =$ $V_{1p} = \begin{bmatrix} \text{pos} \\ \text{neg} \end{bmatrix}$ $V_{1pl} = \begin{bmatrix} \text{pos} \\ \text{neg} \end{bmatrix}$ V_{3pl}				
$V_0 = \begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$				
$S_g^2 =$ $\begin{bmatrix} \text{an} \\ \text{inan} \end{bmatrix}$ $\begin{bmatrix} \text{sg} \\ \text{pl} \end{bmatrix}$ $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ non-pron				

$S_h V_r S_g^2 I$	specate specants	aspect	voiceness voicinity	$3\alpha \beta \gamma \tau_6 / \beta \beta \tau_7$	$3\alpha \beta \tau_6 / \beta \tau_7$
$S_n^1 =$	[an inan sg pl pron 1 2 3 non-pron]				
$V_r =$	[pres past]				
S_n^{1+2}	$V_{imp} =$ [pos neg] $V_{im} =$ [pos neg] V_{3p}				
$V_{dp} =$	[pres past]				
$S_g^2 =$	[an inan sg pl pron 1 2 3 non-pron]				

он захватывал сахару каждый день

он бросил песку каждый день

		бросить	вырастать	достигнуть	захватывать	
$S_n =$	$ S_n V S_g^2 S_a^3 $	x		x x	x	
	[an inan sg pl pron 1 2 3 non-pron]	x x x x x x x		x x x x x x x x	x x x x x x	
	$V = [prespast]$	x x		x x x x	x x x x	
$S_n \neq$	$V_{imp} = [posneg]$ $V_{imp} = [posneg]$ V_{3PI}	x x x		x x x x x x	x x x x	
	$V_0 = [prespast]$					
$S_g =$	[an inan sg pl pron 1 2 3 non-pron]	x x x x x x x		x x x x x x x x x x	x x x x x x x x	
$S_a =$	[an inan sg pl pron 1 2 3 non-pron]	x x x x x x x		x x x x x x x x	x x x x	

$[S_n V_r S_g^2 S_a^3]$	дослать	досчитать	составить	составить	достигать	достичь	захватывать
$S_n^1 =$ 							
$V_r = [$ pres past $V_{r\text{imp}} = [$ pos neg $S_n^2 = V_{r\text{imp}} = [$ pos neg — $V_{r\text{pl}} = [$ pres past							
$S_g^2 =$ 							
$S_a^3 =$ 							

он бросил ему пачку

он бросил ему пачку

бросить

вырасить

достигнуть

захватить

захватить

$S_n V S_g S_d$

$S'_n =$

[an
inan
sg
pl
pron
1
2
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non-pron]

бросить

вырасить

достигнуть

захватить

захватить

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$V =$

[pres
past]

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x x

$S'_{n\oplus} =$

[Vimp
neg]

x x

x x

x x

x x

x x

$V_{1\oplus} =$

[pos
neg]

x x

x x

x x

x x

x x

$V_{3\oplus} =$

[pres
past]

x x

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x x

$S_g^2 =$

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pron
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non-pron]

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$S_d^3 =$

[an
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non-pron]

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x x
x x

$S_n^1 \backslash V_r \backslash S_g^2 \backslash S_d^3$	БРОСАТЬ	БРОСИТЬ	БУРАЗГАТЬ	БУРАЗГИТЬ	ДОСТИГАТЬ	ДОСТИГНУТЬ	ЗАХВАТИТЬ	ЗАХВАТИТЬ
S_n^1	[an in'an] [sg pl] [pron 1 2 3] [non-pron]							
$V_r =$	[pres past]							
$S_g^2 =$	$V_{r\text{imp}} =$ [pos neg] $V_{r\text{imp}} =$ [pos neg] V_{pp}							
S_d^3	[an in'an] [sg pl] [pron 1 2 3] [non-pron]							

		он достиг берега стрелой					
		он достиг столицы юношей					
		он бросил песку лопатой					
<u>SnVSG²S¹</u>		бросай бросил	брасать брасил	выбрасы- выбрасил	достигай достигнул	достичь достигнуть	
$S_n' =$		[an inan]	x x x x	x x x x	x x x x	x x x x	x x x x
		[sg pl]	x x x x	x x x x	x x x x	x x x x	x x x x
		[1 pron]	x x x x	x x x x	x x x x	x x x x	x x x x
		[2 3 non-pron]	x x x x	x x x x	x x x x	x x x x	x x x x
$V =$		[pres past]	x x x x	x x x x	x x x x	x x x x	x x x x
		$V_{imp} =$	x x	x x			x x
		V_{neg}					
$S_n' \neq$		$V_{imp} =$	x x	x x			x x
		V_{neg}					x x
		V_{3pt}	x x	x x	x x	x x	x x
$V_{er} =$		[pres past]					
$S_g^2 =$		[an inan]	x x	x x	x x	x x	x x
		[sg pl]	x x x x	x x x x	x x x x	x x x x	x x x x
		[1 pron]	x x x x	x x x x	x x x x	x x x x	x x x x
		[2 3 non-pron]	x x x x	x x x x	x x x x	x x x x	x x x x
$S_i^3 =$		[an inan]	x x	x x	x x	x x	x x
		[sg pl]	x x x x	x x x x	x x x x	x x x x	x x x x
		[1 pron]	x x x x	x x x x	x x x x	x x x x	x x x x
		[2 3 non-pron]	x x x x	x x x x	x x x x	x x x x	x x x x

		он достиг берега лодкой						
		он достиг берега плаванием						
		он достиг хаты лесом						
		он достигли берега ночью						
$S_{n^2}^1$		достигать	достигнула	достигать	достигнула	достигать	достигнула	достигать
$S_{n^2}^1 =$		[an inan] [sg pl] [pron] [1 2 3] non-pron	x x x x x x x x x x					
$V =$		[pres past]	x x x x					
$S_{n^2}^2 =$		V_{imp} [pos neg] V_{ipf} [pos neg] V_{3pf}	x x x x x x					
$V_\emptyset =$		[pres past]						
$S_g^2 =$		[an inan] [sg pl] [pron] [1 2 3] non-pron	x x x x x x x x x x					
$S_i^3 =$		[an inan] [sg pl] [pron] [1 2 3] non-pron	x x x x x x x x x x					

он захватывал сахару фунтами
он захватил сахару ложкой
он захватил сахару рукой

Sn'VSG ² Si'		захватил	захватить	захватывать	захватила	захватить
$S_n' =$	$\begin{cases} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \quad \\ \quad 1 \\ \quad 2 \\ \quad 3 \\ \text{non-pron} \end{cases}$	x x	x x	x x	x	
$V =$	$\begin{cases} \text{pres} \\ \text{past} \end{cases}$	x x	x x	x x	x	
$S_{n^2}^2 =$	$\begin{cases} V_{imp} = \begin{cases} \text{pos} \\ \text{neg} \end{cases} \\ V_{ipl} = \begin{cases} \text{pos} \\ \text{neg} \end{cases} \\ \text{V3pl} \end{cases}$	x x	x x	x x	x	
$V_B =$	$\begin{cases} \text{pres} \\ \text{past} \end{cases}$					
$S_g^2 =$	$\begin{cases} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \quad \\ \quad 1 \\ \quad 2 \\ \quad 3 \\ \text{non-pron} \end{cases}$	x x	x x	x x	x x	
$S_i^3 =$	$\begin{cases} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \quad \\ \quad 1 \\ \quad 2 \\ \quad 3 \\ \text{non-pron} \end{cases}$	x x	x x	x x	x x	x

$S_n^1 V_r S_g^2 S_l^3$	засматриваться	засматривать	засматриваться	засматривать	засматриваться	засматривать
S_n^1	[an inan sg pl pron 1 2 3 non-pron]					
V_r	$V_r = [$ pres past $V_{r,imp} = [$ pos neg S_g^2 $V_{r,imp} = [$ pos neg $V_{S_l^3}$ $V_{S_l^3} = [$ pres past					
S_g^2	[an inan sg pl pron 1 2 3 non-pron]					
S_l^3	[an inan sg pl pron 1 2 3 non-pron]					

$S_h^1 \setminus S_d^2$	бросать	бросить	вырастать	вырасти	достигать	достигнуть	захватывать	захватить
S_h^1	[an] [inan] [sg] [pl] [1] [2] [3] non-pron							
V	[pres] [past]							
$S_h^1 = \emptyset$	$V_{imp}^1 = [pos]$ $V_{imp}^1 = [neg]$ $V_{1pi} = [pos]$ $V_{1pi} = [neg]$ V_{3pi}							
V_0	[pres] [past]							
S_d^2	[an] [inan] [sg] [pl] [1] [2] [3] non-pron							

$S_h^1 V_r S_d^2$	захватывать	захватить	достигать	достигнуть	вырастать	вырасти	запросить	запросить
$S_h^1 = \begin{cases} an \\ Linan \\ rsg \\ pl \\ pron \\ 1 \\ 2 \\ 3 \\ non-pron \end{cases}$								
$V_r = \begin{cases} pres \\ past \end{cases}$								
$S_d^2 = \begin{cases} V_{imp} \\ neg \\ V_{imp} = \begin{cases} pos \\ neg \end{cases} \\ V_{let} = \begin{cases} pos \\ neg \end{cases} \\ V_{3pl} \end{cases}$								
$V_{neg} = \begin{cases} pres \\ past \end{cases}$								
$S_d^2 = \begin{cases} an \\ Linan \\ rsg \\ pl \\ pron \\ 1 \\ 2 \\ 3 \\ non-pron \end{cases}$								

<u>I</u>	<u>S_nV_sI</u>	спросить	захватить
S_n^1	$\begin{bmatrix} \text{an} \\ \text{inan} \end{bmatrix}$ $\begin{bmatrix} \text{sg} \\ \text{pl} \end{bmatrix}$ $\begin{bmatrix} \text{1} \\ \text{2} \\ \text{3} \end{bmatrix}$ non-pron		
$V =$	$\begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$		
$S_n^{1-\emptyset}$	$V_{\text{imp}} = \begin{bmatrix} \text{pos} \\ \text{neg} \end{bmatrix}$ $V_{1\text{pt}} = \begin{bmatrix} \text{pos} \\ \text{neg} \end{bmatrix}$ $V_{2\text{pt}}$		
$V_p =$	$\begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$		
S_d^{2-1}	$\begin{bmatrix} \text{an} \\ \text{inan} \end{bmatrix}$ $\begin{bmatrix} \text{sg} \\ \text{pl} \end{bmatrix}$ $\begin{bmatrix} \text{1} \\ \text{2} \\ \text{3} \end{bmatrix}$ pres		
	non-pron		
		вырастить	захватить
		вырасты	захватить
		достигнуть	

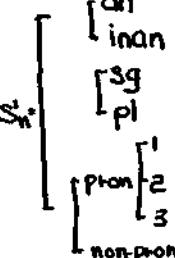
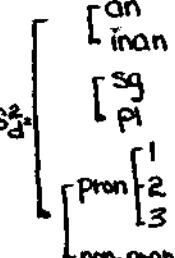
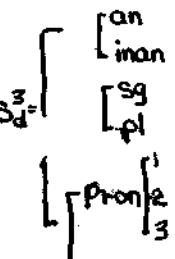
$[S_n^1 V_r S_d^2 I]$	бросать	бросить	вырастать	вырасти	достигать	достигнуть	захватывать	захватить
$S_n^1 =$	[an inan] [sg pl] [pron 1 2 3] [non-pron]							
$V_r =$	[pres past]							
$S_n^2 =$	$V_{1imp} [posneg]$ $V_{2imp} [posneg]$ V_{3pi}							
$V_{r\$} =$	[pres past]							
$S_d^2 =$	[an inan] [sg pl] [pron 1 2 3] [non-pron]							

он вырос ему до плеча

		Бросить	Бросить	Вырасти	Вырасти	достигнуть	достигнуть	захватить	захватить
$S'_n =$	$S'_n =$	X	X	X	X	X	X	X	X
$V_1 =$	$V_1 =$	X	X	X	X	X	X	X	X
$V_{imp} =$	$V_{imp} =$	X	X	X	X	X	X	X	X
$V_{pl} =$	$V_{pl} =$	X	X	X	X	X	X	X	X
V_{3pl}	V_{3pl}	X	X	X	X	X	X	X	X
$V_2 =$	$V_2 =$								
$S'_d =$	$S'_d =$	X	X	X	X	X	X	X	X
$S^3_x =$	$S^3_x =$	X	X	X	X	X	X	X	X
$P_x =$	$P_x =$	G D A I L		до до					

S _{Vr} -S _d -S _x		B6	Б6						
		Б6							
$S'_n = \begin{cases} \text{an} \\ \text{inan} \\ \begin{cases} \text{sg} \\ \text{pl} \end{cases} \\ \begin{cases} \text{pron} \\ 1 \\ 2 \\ 3 \end{cases} \\ \text{non-pron} \end{cases}$		x	x						
$V_r = \begin{cases} \text{pres} \\ \text{past} \end{cases}$		x	x						
$S'_{n\oplus} = \begin{cases} V_r \text{ imp} \\ \begin{cases} \text{pos} \\ \text{neg} \end{cases} \\ V_r \text{ pl} \\ \begin{cases} \text{pos} \\ \text{neg} \end{cases} \\ V_3 \text{ pl} \end{cases}$		x	x						
$V_{r\oplus} = \begin{cases} \text{pres} \\ \text{past} \end{cases}$									
$S^2_n = \begin{cases} \text{an} \\ \text{inan} \\ \begin{cases} \text{sg} \\ \text{pl} \end{cases} \\ \begin{cases} \text{pron} \\ 1 \\ 2 \\ 3 \end{cases} \\ \text{non-pron} \end{cases}$		x	x						
$S^3_x = \begin{cases} \text{an} \\ \text{inan} \\ \begin{cases} \text{sg} \\ \text{pl} \end{cases} \\ \begin{cases} \text{pron} \\ 1 \\ 2 \\ 3 \end{cases} \\ \text{non-pron} \end{cases}$		x	x						
$P_x = \begin{cases} G \\ O \\ A \\ I \\ L \end{cases}$		x	x						

<u>ShVSdS_a</u>	БРОСАТЬ	БРОСИТЬ	ВЫРАСТАТЬ	ДОСТИГАТЬ	ДОСТИГНУТЬ	ЗАХВАТИВАТЬ	ЗАХВАТИТЬ
$S'_n =$	[an inan sg pl pron non-pron]						
$S'_n = \emptyset$	[pres past Vimp. Vimp. V3pl V0 = pres past]						
$S''_d =$	[an inan sg pl pron non-pron]						
$S''_d =$	[an inan sg pl pron non-pron]						

$S_n^1 = S_d^1$	просить просите	вырастать вырасты	достигать достигнут	захватывать захваты
$S_n^2 =$  <p>[an inan] [3g pl]</p> <p>phon [1 2 3] non-phon</p>				
$S_n^3 = S_d^2$  <p>[an inan] [sg pl]</p> <p>phon [1 2 3] non-phon</p>				
$S_d^3 =$  <p>[an inan] [sg pl]</p> <p>phon [1 2 3] non-phon</p>				

ОН ЗАХВАТИЛ МНЕ РЫБУ

Снеговязалка бросает фермеру сноты
он бросает ему цветок

		бросить	бросить	вырастить	достичь	захватить
		браски	бросить	вырастить	достичь	захватить
		бросить	бросить	вырастить	достичь	захватить
$S_n^1 =$	$S_n^2 S_a^3$	[an inan [sg [pl pron-1 pron-2 pron-3 non-pron]	x x x x x x x x x x x x x x	x x x x x x x x x x		x x x x x x x x x x x x
$V =$		[pres past]	x x x x	x x x x		x x x x
$S_n^2 =$	$S_n^1 S_a^3$	$V_{imp} =$ [pos neg] $V_{1pl} =$ [pos neg] V_{3pl}	x x x x x x x x	x x x x x x x x		x x x x x x x x
$V_{\phi} =$		[pres past]				x x x x
$S_d^2 =$		[an inan [sg [pl pron-1 pron-2 pron-3 non-pron]	x x x x x x x x x x x x x x	x x x x x x x x x x x x x x		x x x x x x x x x x x x x x
$S_a^3 =$		[an inan [sg [pl pron-1 pron-2 pron-3 non-pron]	x x x x x x x x x x x x x x	x x x x x x x x x x x x x x		x x x x x x x x x x x x x x

$S_n^1 V_r S_d^2 S_a^3$	БРОСАТЬ БРОСИТЬ	ВЫРАСТАТЬ ВЫРАСТИ	ДОСТИГАТЬ ДОСТИГНУТЬ	ЗАХВАТИВАТЬ ЗАХВАТИТЬ
$S_n^1 =$ $\begin{cases} \text{an} \\ \text{inan} \end{cases}$ $\begin{cases} \text{sg} \\ \text{pl} \end{cases}$ $\begin{cases} 1 \\ 2 \\ 3 \end{cases}$ $\begin{cases} \text{pron} \\ \text{non-pron} \end{cases}$	X X X X X X			
$V_r =$ $\begin{cases} \text{pres} \\ \text{past} \end{cases}$ $\begin{cases} \text{imp} \\ \text{impf} \end{cases}$ $\begin{cases} \text{pos} \\ \text{neg} \end{cases}$ $\begin{cases} \text{pos} \\ \text{neg} \end{cases}$ V_{3p1} $V_{1,2p} =$ $\begin{cases} \text{pres} \\ \text{past} \end{cases}$	X X X X X X			
$S_d^2 =$ $\begin{cases} \text{an} \\ \text{inan} \end{cases}$ $\begin{cases} \text{sg} \\ \text{pl} \end{cases}$ $\begin{cases} 1 \\ 2 \\ 3 \end{cases}$ $\begin{cases} \text{pron} \\ \text{non-pron} \end{cases}$	X X X X X X			
$S_a^3 =$ $\begin{cases} \text{an} \\ \text{inan} \end{cases}$ $\begin{cases} \text{sg} \\ \text{pl} \end{cases}$ $\begin{cases} 1 \\ 2 \\ 3 \end{cases}$ $\begin{cases} \text{pron} \\ \text{non-pron} \end{cases}$	X X X X X X			

$S_n^1 \vee S_d^2 \vee S_i^3$	заслужить	вырастить	вырасти	достигнуть	захватывать	захватить
$S_n^1 =$ $\begin{cases} \text{an} \\ \text{inan} \end{cases}$ $\begin{cases} \text{sg} \\ \text{pl} \end{cases}$ $\begin{cases} \text{pron} \\ 1 \\ 2 \\ 3 \end{cases}$ non-pron						
$S_d^2 =$ $V = \begin{cases} \text{pres} \\ \text{past} \end{cases}$ $V_{imp} = \begin{cases} \text{pos} \\ \text{neg} \end{cases}$ $V_{1pt} = \begin{cases} \text{pos} \\ \text{neg} \end{cases}$ V_{3pt} $V_p = \begin{cases} \text{pres} \\ \text{past} \end{cases}$						
$S_i^3 =$ $\begin{cases} \text{an} \\ \text{inan} \end{cases}$ $\begin{cases} \text{sg} \\ \text{pl} \end{cases}$ $\begin{cases} \text{pron} \\ 1 \\ 2 \\ 3 \end{cases}$ non-pron						

S _n V-S _d ² S _t ³		BROCATB	DOSTVATB	ZAXBATN/TB
S _n ' =	[an inan sg pl phon 1 2 3 non-phon]	x x x x x x x x		
V _t =	[pres past]			
V _{timp} =	[pos neg]			
S _d ' =	V _{timp} = [pos neg]			
V _{tpl} =				
V _{t0} =	[pres past]			
S _d ² =	[an inan sg pl phon 1 2 3 non-phon]	x x x x x x x x		
S _t ³ =	[an inan sg pl phon 1 2 3 non-phon]	x x x x x x x x		

S ² V _r S ¹				S ¹ P _r S ²		S ¹ S _r S ²		S ² S _r S ¹		S ¹ V _s S ²	
				S ¹ P _r S ²		S ¹ S _r S ²		S ¹ S _r S ²		S ¹ V _s S ²	
				S ¹ P _r S ²		S ¹ S _r S ²		S ¹ S _r S ²		S ¹ V _s S ²	
S _n ²	an inan	3sg pl	phon non-phon	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
V _r = pres past	X	X									
V _r imp neg	X	X									
V _r 1pl = pres past	X	X									
V _r 3pl	X	X									
V _r <sub>2 = pres past	X	X									
S _t ²	an inan	3sg pl	phon non-phon	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X

		он вырастал чудом							
		деревья вырастили рядами							
		он вырос слепым							
		бросать бесстыдно							
$S_h^1 V S^2$		вырастать вырастить	вырастать вырастить	вырастать вырастить	вырастать вырастить	вырастать вырастить	вырастать вырастить	вырастать вырастить	
$S_h^1 =$		x x	x x	x x	x x	x x	x x	x x	
[an inan]		x x	x x	x x	x x	x x	x x	x x	
[sq pl]		x x	x x	x x	x x	x x	x x	x x	
pron [1 2 3]		x x	x x	x x	x x	x x	x x	x x	
non-pron		x x	x x	x x	x x	x x	x x	x x	
$V =$		x x	x x	x x	x x	x x	x x	x x	
[pres past]		x x	x x	x x	x x	x x	x x	x x	
S_{h-p}^1		x x	x x	x x	x x	x x	x x	x x	
$V_{imp} =$		x	x	x	x	x	x	x	
[pos neg]		x	x	x	x	x	x	x	
$V_{pl} =$		x x	x x	x x	x x	x x	x x	x x	
V_{3pl}		x x	x x	x x	x x	x x	x x	x x	
$V_0 =$		x x	x x	x x	x x	x x	x x	x x	
$S_i^2 =$		x x	x x	x x	x x	x x	x x	x x	
[an inan]		x x	x x	x x	x x	x x	x x	x x	
[sq pl]		x x	x x	x x	x x	x x	x x	x x	
pron [1 2 3]		x x	x x	x x	x x	x x	x x	x x	
non-pron		x x	x x	x x	x x	x x	x x	x x	

S_n^1	достига́ть	достигну́ть	захва́тыва́ть	захва́тить
$S_n^1 =$	[an inan sg pl 1 pron 2 3 non-pron]			
$V =$	[pres past]			
$S_n^2 = \emptyset$	$V_{1p1} =$ [pos neg] $V_{1p1} =$ [pos neg] V_{3p1}			
$V_{21} =$	[pres past]			
S_l^2	[an inan sg pl 1 pron 2 3 non-pron]			

S_h^1	бросать	бросить	вырасти	вырастать	достигать	достигнуть	захватывать	захватить
$S_h^1 =$ 								
$V = [pres past]$								
S_{imp}^1 								
$V_{30} = [pres past]$								
S_h^2 								

ОН ВЫРАСТАЛ ГОЛОВОЙ ВЫШЕ БРАТА

ЕЛКА ВЫРОСЛА ВЕТКАМИ КНИЗУ

	бросать	вырасти	вырастить	вырастать	достигать	захватывать
$S_h^1 = [S_h V Q S_t^1]$				X X		
$S_h^1 = \begin{cases} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{non-pron} \end{cases}$		X X X X X X X X X X		X X X X X X X X X X		
$V = [\text{pres}$		X X	X X			
$V = [\text{past}]$	X X	X X				
$S_h^{1,0} = \begin{cases} V_{imp.} \\ \text{пес} \\ V_{pl.} \\ \text{пес} \\ V_{3pl} \end{cases}$		X X X X X X X X	X X X X X X X X			
$V_{ps} = [\text{pres}$						
$V_{ps} = [\text{past}]$						
$S_t^2 = \begin{cases} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{non-pron} \end{cases}$		X X X X X X X X	X X X X X X X X			

МАЧ БРОСАЕТСЯ (о стену) часами
БОМБЫ БРОСАЮТСЯ тоннами

он бросилась стрелой

мы бросаемся камнями

лошадь бросилась галопом

1 \$n Vr \$i		бросатъ броситъ	бросать броситъ	бросатъ бросить	бросатъ бросить	бросатъ бросить	бросатъ бросить
\$n' =	[an inan [sq pl pron non-pron]	x	x x	x x	x	x	
			x x	x x	x	x	
		x	x x	x x	x	x	
	x	x x	x x	x	x	x	
	x	x x	x x	x	x	x	
	x	x x	x x	x	x	x	
	x	x x	x x	x	x	x	
Vr =	[pres past]	x	x x	x x	x	x	
	x	x x	x x	x	x	x	
Si =	Vimp [pos neq] V-imp [pos neq] V3p]	x	x x	x x			
	x	x x	x x				
	x	x x	x x				
	x	x x	x x				
	x	x x	x x				
	x	x x	x x				
Vr3 =	[pres past]						
Si2 =	[an inan [sq pl pron non-pron]	x		x x	x	x	
		x	x x	x x	x	x	
		x	x x	x x	x	x	
	x	x x	x x	x	x	x	
	x	x x	x x	x	x	x	
	x	x x	x x	x	x	x	
	x	x x	x x	x	x	x	

Тленники захватываются десятками
 солдат захватывается тленником
успех достигается годами
богатство достигается трудом

$S_n^1 V_r S_i^2$

$S_n^1 =$
 [an
inan
[sg
pl
pron [1
2
3
non-pron

выражать
 выражаст
 достичь
 достигнув
 достигать
 достигнув
 захватить
 захватывая
 захватить

$V_r =$ [pres
past

$S_{n,\phi}^1$
 Vimp [pos
neg
V1pt [pos
neg
V3pt

$V_{r,\phi} =$ [pres
past

$S_i^2 =$
 [an
inan
[sg
pl
pron [1
2
3
non-pron

Город захватывается месяцами
Рыба захватывается хитростью
Сено захватывается охапками

		захватить	захватить	захватить	захватить	захватить
		захватить	захватить	захватить	захватить	захватить
$S_n^1 =$	$\begin{bmatrix} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{non-pron} \end{bmatrix}$	x	x x	x x	x x	x
$V_r =$	$\begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$	x	x x	x x	x x	x
$S_n^2 =$	$\begin{bmatrix} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{non-pron} \end{bmatrix}$	x	x x	x x	x x	x
$V_{r\theta} =$	$\begin{bmatrix} \text{pres} \\ \text{past} \end{bmatrix}$					

		ГОРОД ЗАХВАТЫВАЕТСЯ МЕСЯЦАМИ				
		РЫБА ЗАХВАТЫВАЕТСЯ ХИТРОСТЬЮ				
		СЕНО ЗАХВАТЫВАЕТСЯ ОХАПКАМИ				
$S^1 V^r S^2$		захватывать	захватить	захватывать	захватить	захватывать
$S^1 =$		[an inan sg pl pron 1 2 3 non-pron]	x x x x x x x	x x x x x x x	x x x x x x x	x x x x x x x
$V^r =$		[pres past]	x x	x x	x x	x x
S^1_{neg}		$V^{imp} =$ [pos neg] $V^{pl} =$ [pos neg] V^{3pl}				
$V^p =$		[pres past]				
$S^2 =$		[an inan sg pl pron 1 2 3 non-pron]	x x x x x x x	x x x x x x x	x x x x x x x	x x x x x x x

$S'_n S^2_i$	бросать	бросить	вырастать	вырасти	достигать	достичь	захватывать	захватить
$S'_n =$ $\begin{bmatrix} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{non-pron} \end{bmatrix}$								
$V_r = [\text{pres}$ $\text{past}]$								
$S'_n = \emptyset$ $\begin{bmatrix} V_{imp} \\ pos \\ neg \\ V_{imp} \\ pos \\ neg \\ \checkmark 3pt \end{bmatrix}$								
$V_{r\phi} = [\text{pres}$ $\text{past}]$								
$S^2_i =$ $\begin{bmatrix} \text{an} \\ \text{inan} \\ \text{sg} \\ \text{pl} \\ \text{pron} \\ \text{non-pron} \end{bmatrix}$								

он достиг до берега ночью.
он достиг до берега стрелой
дерево выросло ветками до земли
оббросает бутылками в драке

Sn' VSip Sx ³		брисать бросить		вырастать вырасти		достигать достигнуть		достигать достигнуть		достигать достигнуть	
S _{n'} =	[an inan [sq [pl [pron [/ [3 non-pron]	x x	x x	x x	x	x x	x x	x x	x x	x x	x x
V =	[pres past]	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
S _{n'φ} =	[Vimp [pos [neg [Vipl [pos [neg [V3pt]	x x	x x	x x		x x	x x	x x	x x	x x	x x
V _φ = [pres past]											
S _i ² =	[an inan [sq [pl [pron [/ [3 non-pron]	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
S _x ³ =	[an inan [sq [pl [pron [/ [3 non-pron]	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
P _x =	G D A I L	x x	40	40	40	40	40	40	40	40	40

		он достиг до берега лодкой							
		он достиг до берега плыванием							
		они достигли до берега вереницей							
$S_n^1 VS_i^2 p S_x^3$		достигать	достигнуть	достигать	достигнуть	достигать	достигнуть	достигать	достигнуть
$S_n' =$	[an]	X X	X X	X X	X X	X X	X X	X X	
	[inan]	X X	X X	X X	X X	X X	X X	X X	
	[sg]	X X	X X	X X	X X	X X	X X	X X	
	[pl]	X X	X X	X X	X X	X X	X X	X X	
	/pron	X X	X X	X X	X X	X X	X X	X X	
	2 pron	X X	X X	X X	X X	X X	X X	X X	
$V =$	non-pron	X X	X X	X X	X X	X X	X X	X X	
	[pres]	X X	X X	X X	X X	X X	X X	X X	
	[past]	X X	X X	X X	X X	X X	X X	X X	
$S_{n+o}^1 V_{1pl}^2 [pos]$	[neg]	X X	X X	X X	X X	X X	X X	X X	
	[pos]	X X	X X	X X	X X	X X	X X	X X	
	[neg]	X X	X X	X X	X X	X X	X X	X X	
	[3pl]	X X	X X	X X	X X	X X	X X	X X	
$V_\emptyset = [Pres]$	[past]								
$S_j^2 =$	[an]								
	[inan]	X X	X X	X X	X X	X X	X X	X X	
	[sg]	X X	X X	X X	X X	X X	X X	X X	
	[pl]	X X	X X	X X	X X	X X	X X	X X	
	/pron								
	2 pron								
$S_x^3 =$	non-pron	X X	X X	X X	X X	X X	X X	X X	
	[an]	X X	X X	X X	X X	X X	X X	X X	
	[inan]	X X	X X	X X	X X	X X	X X	X X	
	[sg]	X X	X X	X X	X X	X X	X X	X X	
	[pl]	X X	X X	X X	X X	X X	X X	X X	
	/pron	X X	X X	X X	X X	X X	X X	X X	
$P_x =$	3 pron	X X	X X	X X	X X	X X	X X	X X	
	G	40	40	40	40	40	40	40	
	D								
	A								
	I								
	L								

		ОН БРОСИЛСЯ Ребенком с моста				
		ОН БРОСИЛСЯ Головой под Тюезд				
		Бросить бросить		Бросать бросить		Бросать бросить
						Выбрасывать выбрасить
$S_n^1 =$	$\boxed{SnVrS_1^2 pS_x^3}$	X	X	X	X	X
	[an inan]					
	[sg pl]	X	X	X	X	X
	[' pron 2 3]	X	X	X	X	X
	non-pron	X	X	X	X	X
$V_p =$	[pres past]	X	X	X	X	X
		X	X	X	X	X
$S_{n+g}^1 =$	V_{imp} [pos neg]	X	X	X	X	X
	$V_t pt$ [pos neg]	X	X	X	X	X
	$V_3 pt$	X	X	X	X	X
$V_{tp} =$	[pres past]					
$S_i^2 =$	[an inan]	X	X	X	X	X
	[sg pl]	X	X	X	X	X
	[' pron 2 3]	X	X	X	X	X
	non-pron	X	X	X	X	X
$S_x^3 =$	[an inan]	X	X	X	X	X
	[sg pl]	X	X	X	X	X
	[' pron 2 3]	X	X	X	X	X
	non-pron	X	X	X	X	X
$P_x =$	G	X	X	X	X	X
	D	X	X	X	X	X
	A	X	X	X	X	X
	I	X	X	X	X	X
	L	X	X	X	X	X

		Солдат захватывается пленником на поле битвы					
		успех достигается трудом в Америке		успех достигается годами в индустрии		захватываются десятками на поле битвы	
		достигать	достигнуть	достигать	достигнуть	захватывать	захватить
S_n'	$S_n V_r S_i^{\varepsilon} p S_x^s$	x x	x	x	x	x x	
	[an. inan]	x x	x	x	x	x x	
	[sq pl]	x x	x	x	x	x x	
	[pron 1 2 3]	x x	x	x	x	x x	
	[non-pron]	x x	x	x	x	x x	
V_r	[pres past]	x x	x	x			
		x x	x	x			
$V_{r imp}$	[Pos neg]			x			
$V_{r imp}$	[Pos neg]			x			
V_{3pl}				x			
V_{reg}	[pres past]						
S_i^{ε}	$S_n V_r S_i^{\varepsilon} p S_x^s$	x x	x	x	x	x x	
	[an. inan]	x x	x	x	x	x x	
	[sq pl]	x x	x	x	x	x x	
	[pron 1 2 3]						
	[non-pron]	x x	x	x	x	x x	
S_x^s	$S_n V_r S_i^{\varepsilon} p S_x^s$	x x	x	x	x	x x	
	[an. inan]	x x	x	x	x	x x	
	[sq pl]	x x	x	x	x	x x	
	[pron 1 2 3]	x x	x	x	x	x x	
	[non-pron]	x x	x	x	x	x x	
P_x	[G O A I L]	x x	x	x	x	x x	
		x x	x	x	x	x x	
		x x	x	x	x	x x	
		x x	x	x	x	x x	
		x x	x	x	x	x x	

		Город захватывается месяцами с севера				
		Рыба захватывается сетью с большим количеством				
		Сено захватывается охотками в амбаре				
$S_n^1 V_r S_1^2 p S_x^3$		захватывать	захватить	захватывать	захватить	захватывать
$S_n^1 =$	[an]	X	X X	X X	X X	X
	[inan]	X	X X	X X	X X	X
	[sg]	X	X X	X X	X X	X
	[pl]	X	X X	X X	X X	X
$S_n^2 =$	/					
	[pron]	X	X X	X X	X X	X
	-2	X	X X	X X	X X	X
	-3	X	X X	X X	X X	X
$V_r =$	[non-pron]	X	X X	X X	X X	X
	[pres]	X	X X	X X	X X	X
$V_r \beta =$	[past]	X	X X	X X	X X	X
$S_n^3 =$	$V_{r\text{imp}}$					
	[pos]					
	[neg]					
	$V_{r\text{lpt}}$					
$S_1^2 =$	$V_{3\text{pt}}$					
	[an]	X	X X	X X	X X	X
	[inan]	X	X X	X X	X X	X
	[sg]	X	X X	X X	X X	X
$S_x^3 =$	[pl]	X	X X	X X	X X	X
	/	X	X X	X X	X X	X
	[pron]	X	X X	X X	X X	X
	-2	X	X X	X X	X X	X
$pX =$	-3	X	X X	X X	X X	X
	[non-pron]	X	X X	X X	X X	X
$pX =$	G	X	X X	X X	X X	X
	D	X	X X	X X	X X	X
	A	X	X X	X X	X X	X
	I	X	X X	X X	X X	X
	L	X	X X	X X	X X	X

$S_n^1 V S_i^2 I$	бросать	вырастить	достигать	захватывать
$S_n^1 =$	[an inan sg pl pron 1 2 3 non-pron]			
$V =$	[pres past]			
S_{nps}^1	$V_{imp} = \{ pos, neg \}$ $V_{1pl} = \{ pos, neg \}$ V_{3pl}			
$V_p =$	[pres past]			
$S_i^2 =$	[an inan sg pl pron 1 2 3 non-pron]			

$S_n^1 \cup V_r S_i^2 I$	бросать	бросить	вырастать	вырастти	достигать	достигнуть	захватывать	захватить
$S_n^1 =$ [an inan sg pl pron 1 2 3 non-pron]								
$V_r =$ [pres past]								
$S_n^1 =$ $V_{imp} =$ [pos neg] $V_{1pl} =$ [pos neg] V_{3pl}								
$V_{np} =$ [pres past]								
$S_i^2 =$ [an inan sg pl pron 1 2 3 non-pron]								

дерево выросло быстрым темпом

	бросай	бросить	вырастай	вырасти	достигать	достигнуть	захватывать	захватить
$S^1_{\text{V}ASi}$			x x	x x				
S'_{in}	[an inan]	x x	x x	x x				
	[sg pl]	x x	x x	x x				
	[pron] [1 2 3]	x x	x x	x x				
	non-pron	x x	x x	x x				
$V_{\text{p}}:$ [pres past]		x x	x x					
$V_{\text{imp}}:$ [pos neg]		x x	x					
$V_{\text{fr}}:$ [pos neg]		x x	x x					
	V_{3pl}	x x	x x					
$V_{\text{pd}}:$ [pres past]								
S^2_i	[an inan]	x x						
	[sg pl]	x x						
	[pron] [1 2 3]							
	non-pron	x x						

он бросился большими шагами

он бросился быстрыми шагами

	бросать	бросить	бросать	бросить	вырасить	вырасить	достигнуть	достигнутие	захватывать	захватить
$S_n' = [S_n V_r S_i^2]$	X X		X X							
S_n'	[an linan [sg [pl pron -1 -2 -3 non-pron	X X	X X	X X	X X	X X				
$V_r = [\text{pres}$	X X		X X							
$V_r = [\text{past}$	X X		X X							
$S_{n-\theta} = [V_{r\text{imp}}[\text{pos}$	X X		X X							
$S_{n-\theta}$	[neg $V_{r\text{pl}}[\text{pos}$ [neg $V_{r\text{pl}}$	X X		X X						
$V_{r\theta} = [\text{pres}$										
$V_{r\theta} = [\text{past}$										
$S_i^2 = [an$	X X		X X							
S_i^2	linan [sg [pl pron -1 -2 -3 non-pron	X X	X X	X X						

		ОН БРОСИЛ ПЕСОК ПУЛАМИ							
		ОН БРОСИЛ САХАР МЕШКАМИ							
		ОН БРОСИЛ ПЕСОК ЛОПАТОЙ							
		ЕМУ КОРАБЛЬ БРОСАЛО ВЕТРОМ							
ОНИ БРОСИЛИ ЕГО РЕБЕНКОМ		бросить	бросить	бросить	бросить	бросать	бросать	бросать	бросить
$S_n^1 V S_a^2 S_t^3$		бхнить	брасить	брасить	брасить	брасить	брасать	брасать	брасить
$S_n' =$		[an inan]	x x		x x	x x	x x	x x	x x
		[sg pl]	x x		x x	x x	x x	x x	x x
		[1 2 3 non-pron]	x x		x x	x x	x x	x x	x x
			x x		x x	x x	x x	x x	x x
$V =$		[pres past]	x x		x x	x x	x x	x x	x x
			x x		x x	x x	x x	x x	x x
$S_{n,p}^1$		$V_{n,p} =$ [pos neg]	x x		x x	x x	x x	x x	x x
		$V_{p,p} =$ [pos neg — $V_{3,p}$]	x x		x x	x x	x x	x x	x x
			x x		x x	x x	x x	x x	x x
$V_p =$ [pres past]			x x		x x	x x	x x	x x	x x
			x x		x x	x x	x x	x x	x x
$S_a^2 =$		[an inan]	x x	x x	x x	x x	x x	x x	x x
		[sg pl]	x x	x x	x x	x x	x x	x x	x x
		[1 2 3 non-pron]	x x	x x	x x	x x	x x	x x	x x
			x x	x x	x x	x x	x x	x x	x x
$S_t^3 =$		ан	x x		x x	x x	x x	x	x
		инан	x x		x x	x x	x x	x	x
		сг	x x		x x	x x	x x	x	x
		пл	x x		x x	x x	x x	x	x
		[1 2 3 г-р-он]	x x	x x	x x	x x	x x	x	x
			x x	x x	x x	x x	x x	x	x

он захватывал рыбу сетью
он захватил власть силой

он захватил рубашку рукой

они захватили солдата пленником

захватить
захваты

захватить
захваты

захватить
захваты

захватить
захваты

захватить
захваты

захватить
захваты

$S_n^1 V S_a^2 S_i^3$

$S_n^1 =$
 [an
inan
[sg
[pl
pron [1
[2
[3
non-pron

$V =$ pres
past

$V^{imp} =$ pos
neg
 $S_n^1 \phi =$ pos
neg
 V_{3pl}

$V_\beta =$ pres
past

$S_a^2 =$
 [an
inan
[sg
[pl
pron [1
[2
[3
non-pron

$S_i^3 =$
 [an
inan
[sg
[pl
pron [1
[2
[3
non-pron

		он захватывал его студентом				
		он захватывал сено охатками				
		он захватывал рыбь лесятками				
$S_h V S^{\frac{1}{2}} & S^{\frac{3}{2}}$		захватывал	захватывал	захватывал	захватывал	захватывал
S_h'		x	x x	x x	x x	
an inan		x	x x	x x	x x	
[sg pl]		x	x x	x x	x x	
pron		/ x	x x	x x	x x	
2 x		x x	x x	x x	x x	
3 x		x x	x x	x x	x x	
non-pron		x	x x	x x	x x	
$V =$		pres x	x x	x x	x x	
past x			x x	x x	x x	
$S_h^{\frac{1}{2}} \phi$			x x	x x	x x	
V_{imp}		pos x	x x	x x	x x	
neg x			x x	x x	x x	
V_{imp}		pos x	x x	x x	x x	
neg x			x x	x x	x x	
V_{3p}		x	x x	x x	x x	
$V_p =$		pres				
past						
$S_a^{\frac{1}{2}}$			x x	x x	x x	
an inan		x	x x	x x	x x	
[an inan]		x	x x	x x	x x	
[sg pl]		x	x x	x x	x x	
pron		/ x	x x	x x	x x	
2 x		x x	x x	x x	x x	
3 x		x x	x x	x x	x x	
non-pron		x	x x	x x	x x	
$S_i^{\frac{3}{2}}$			x x	x x	x x	
an inan		x	x x	x x	x x	
[an inan]		x	x x	x x	x x	
[sg pl]		x	x x	x x	x x	
pron		/ x	x x	x x	x x	
2 x		x x	x x	x x	x x	
3 x		x x	x x	x x	x x	
non-pron		x	x x	x x	x x	

1.5 The Development of Programs for the Resolution of Semantic Ambiguities¹¹

After this considerable amount of data had been gathered for each of the first 240 verbs from the original memory of 13,964 semantic units, it was decided to check the effectiveness of their additional grammatical information in the resolution of grammatical and semantic ambiguities. The most obvious and very first step in this procedure was the collection of all sentences containing the first 240 verbs from the original corpus of 111 text passages. This yielded about 500 Russian sentences. This group of sentences was scanned for verbs with more than one target alternative. There were originally 103 such verbs. The number was subsequently reduced to 97 when the number of alternatives of 6 verbs was reduced to one after a careful reconsideration of the semantic sphere of these verbs. All verbs with only one alternative were tested for accuracy and intelligibility within their various sentences. In all cases the results were satisfactory. Reduction of the number of verbs being analyzed from 240 to 103 naturally reduced the number of illustrative sentences in the original corpus; therefore a rather intensive search was instituted for additional sentences containing the 103 verbs. The following is a list of Russian books perused for additional illustrative material.

1. Абиани, В. Х., Реактивные Двигатели, Москва, 1955.
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3. Гурев, Г., Системы Мира, Москва, 1950.
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These 12 additional sources increased the number of illustrative sentences to some 2000. After these sentences were grouped according to their constituent verbs, they formed the basis for the subsequent analysis. Even a cursory examination of the material to be presented below will reveal that the collected sentences were only a point of departure; for the analyses, even though incompletely tested, go far beyond the Russian sentences gathered and attempt to pinpoint each alternative within those basic phrase structures that could be foreseen. One point must definitely be emphasized. This material does test the effectiveness of certain types of additional grammatical (syntactic) and semantic information in pinpointing intended meaning, but it always presupposes that the basic phrase structures have been already isolated. The problem of recognition of constituent structures is very serious, indeed; and it undoubtedly involves much more grammatical information than that developed in this study.

The grammatical information compiled in this study has already been exemplified. The semantic information collected remains to be discussed.

The resolution of the semantic ambiguities associated with a given verb may be significantly aided by the semantic clues found in other constituent members of the syntactic arrangement in which the verb is found. For example, the verb "бродить" in the UW Operational MT Lexicon has two alternatives: 1) to wander, 2) to ferment. Obviously only a relatively limited class of substantives can ferment. If we label these substantives by a symbol indicating this property and label the verb with this symbol, when the two appear in a subject-predicate relationship, the proper choice can be made. Substantives which can ferment can appear with other verbs for which this property is not relevant, but other properties such as inanimateness, animateness, concreteness, abstractness, etc., are relevant. Each substantive, therefore, will have to have complex tags and the complexity, at least in part, will depend on the demands of all the verbs with multiple meaning in the MT dictionary.

During the analysis of the 103 verbs with multiple alternatives, a list of substantive categories (see 1.6 below) required to solve all or some of the ambiguities in these verbs was compiled. This list forms the basis of the semantic analysis. It is arranged in a hierarchical order from the most general categories to the most specific. It includes only those categories which were found necessary to resolve ambiguities in the verbs considered. The choice of categories and their hierarchy is strictly functional, i.e., each category was chosen because it defines a group of substantives as different from the substantives in other categories on the same hierarchical level. Each of the broader categories then has subcategories serving this same purpose. The choice and definition of the general categories posed a number of problems. For example, the traditional concepts of what is concrete and what is abstract did not provide an absolute and clear-cut guide. Early in the course of the analysis, the investigators were convinced that there is no clear line of distinction between the two concepts and that many substantives could be placed equally well in either category. On the other hand, a sufficient number of substantives can be clearly labeled as concrete or abstract so that it is definitely worthwhile to make use of these categories. Those substantives about which there was originally a question as to whether they should be labeled concrete or abstract were classified on the basis of whether

¹¹I am indebted to Mr. Rasic Dumatov for much help in presenting these data.

they behaved like substantives which were clearly abstract or clearly concrete. Thus, a substantive like "поверхность" "surface," "дно," "bottom," etc. are regarded as concrete, since they were found to behave in the same way as clearly concrete objects, parts of which the above substantives describe, e.g., "поверхность стола," "the surface of the table," behaves like "стол," "table," etc. On the other hand, a group of substantives, such as "количество," "quantity," "сумма," "sum," etc. can refer to either abstract or concrete substantives, e.g., "количество столов," "a quantity of tables," or "количество идей," "a quantity of ideas." These substantives will behave semantically like the substantives qualifying them. Therefore, these substantives acquire the label of the qualifying member of the block.

Besides the categories of abstract and concrete things, two other general categories were used: animate things and geographical and political terms. The latter stands for place names and geographical subdivisions of the earth's surface, which always behave like members of the concrete category but sometimes may also behave like members of the animate category. Since both the animate and the geographical-political are always concrete, this fact was not specified. Consequently, the categories concrete and abstract necessarily mean inanimate concrete and abstract, and in this case the classification inanimate is implicit.

The subcategories under these four broad categories are self-explanatory (when considered in the light of the verbs which made these categories necessary) and need no further explanation.

In the process of classifying substantives, each substantive has to be taken through the list of categories as far as possible, and at each hierarchical level it must be labeled with those categories which apply to it. For example, if a given substantive is concrete, it is labeled II; if it is also a substance (it does not have a definite shape, as opposed to objects which do), it is labeled IIA; if it is also a liquid, as opposed to a gas or a powder, it is labeled IIA1; if it is a liquid metal, it must also be labeled as such, namely IIA1 and IIA2, i.e., IIA1-2; if this liquid metal can act as a catalyst, it must be labeled IIA1-2-3; etc.

If all the verbs with multiple alternatives in the MT lexicon have been analyzed, the list of categories would have been much larger; and perhaps further subclassification of the present categories would have been necessary.

The results of the syntactic and semantic analysis for each verb with multiple alternatives are presented in a table representing a kind of computer program to be followed step by step. Each horizontal line contains a kernel pattern in which this verb may be found. If one or more of the members of the pattern are labeled "any," it means that the member so labeled does not offer any relevant clues for the elimination of ambiguities, e.g., the member may be a substantive of any category, or it may be a zero construction as in the case of the frequent impersonal constructions in Russian. If in a given pattern one or more members contain two or more substantive categories, each category makes up a separate pattern with all the categories in the other members of the pattern. So, for example:

<u>Subject</u>	<u>Object</u>	<u>Choose</u>
I, III, IV	II, IV	1

means combinations Subject I - Object II, Subject I - Object IV, Subject III - Object II, Subject III - Object IV, etc. All of these combinations result in Choice 1.

The order of the patterns is extremely important. They are arranged in such a way that the clues resulting in the elimination of the greatest number of ambiguities are listed first whenever possible. Also, the patterns containing the more specific categories are listed before those with more general categories. For example, the program for *дрожать* - (to)tremble/vibrate looks like this:

<u>Subject (Sn)</u>	<u>Choose</u>
I, IIB2 (a)(b)(c)	1
II	2

This means that if the subject is I = animate, or IIB2(a)(b)(c) = concrete, object, natural object, plant, or fruit or vegetable, or part of body, the choice will be (to)tremble. If the subject is not one of these, the next pattern is considered. Because of the nature of this verb, only concrete substantives can act as subjects.. After elimination of the categories in the first pattern, therefore, the subject of the second pattern could be designated as "any." Since, however, in this environment it can only denote something concrete, it is preferable to label it as such because this information might be needed for other purposes, e.g., to determine whether a given substantive is in fact the subject of this verb.

Below are several sentences taken from the MT articles, showing the method and the possibilities of using this material for eliminating ambiguities. In each case the kernel pattern is first isolated, the corresponding pattern in the program for the appropriate verb is located, and the proper choice of alternative for the verb is automatically chosen.

1. При регулировке муфты сцепления необходимо выключить муфту отключением рычага 10.

Here the kernel pattern is the combination "выключить муфту." The program for *выключить* - (to) exclude/switch-off/disengage is as follows:

<u>Subject (Sn)</u>	<u>Object (Sa)</u>	<u>Prep. phrase (pSx)</u>	<u>Choose</u>
any	I, III		1
any	any	из gen.	1
any	IIB1(b)(2)		3
any	IIB1(b), IV		2

The substantive *муфту* - clutch/muff/coupling₈₁/socket₈₁, being concrete, object, man-made, machine, part of a machine, would have the tag IIB1(b)(2). As can be seen in the program, information about the subject is not

relevant, and only the object and prepositional phrase, if any, need be considered. The first pattern calls for an object in category I or III; the second for "any" object, but with a prepositional phrase, which is not present in the pattern under discussion; the third pattern matches the tag for *муфты*, and alternative 3 is chosen. This example underscores the importance of having pattern 3 before pattern 4, which contains a more general category than that of pattern 3.

2. Поэтому тут можно выделить две подзоны.

Again the combination "выделить подзоны" is extracted. The program for выделить - (to)discharge/¹₂ isolate/allot is as follows:

<u>Subject</u> (Sn)	<u>Object</u> (Sa)	<u>Prep. Phrase</u> (pSx)	<u>Choose</u>
any	IIA, IVA1		1
IIB2	any		1
IIA7	any		2
any	IV		2
any	any	K Dat.	3
I, II, III	IIB		2
IV	I, II		3

According to the list of substantive categories, подзоны - subzone(s) has the tag IVA = abstract, nonverbal. Since the kernel pattern is impersonal, the subject of this pattern is designated as "any." Now the pattern Sn any - Sa IVA must be matched against the program. The first pattern of the program has Sn any, Sa IIA or IVA1 and would appear to include the tag IVA for "subzone." IVA1 is too specific, however, since each tag includes all categories hierarchically lower than it, i.e., more specific, but not those hierarchically higher, i.e., more general. Farther down the list pattern 4, Sn any - Sa IV, corresponds to the pattern in question, since category IV includes all the categories under it (all abstract substantives).

3. В этом районе яблоки доходят очень рано.

The kernel pattern is "яблоки доходят." The program for доходят - (they)reach/ripen/are-done is as follows:

<u>Subject</u> (Sn)	<u>Prep. Phrase</u> (pSx)	<u>Instr.</u> (Si)	<u>Choose</u>
IIB1(c)			1
any	до gen.		1
IIB-2(b)			2
IIA			3
I		IV	2

After ЯБЛОКИ - apples is matched against the list of categories, it acquires the tag IIB2(b): II = concrete, B = objects, 2 = natural objects, (b) = fruits and vegetables. It is not followed by a "до" prepositional phrase; so it does not conform to pattern 2. It does match pattern 3, which allows the selection of equivalent 2: (they)ripen (the problem of (they) is handled by other programs).

4. The verb ЭАХВАТНВАТЬ - (to)take/include/catch/captivate proved to be one of the more difficult verbs considered and consequently, has the most complex program. The program was worked out primarily on the basis of six illustrative sentences. The complete program appears below. After the program each of the six sentences in turn is matched against the program for resolution of their semantic ambiguities.

<u>Subject</u> (Sn)	<u>Object</u> (Sa)	<u>Prep. Phrase</u> (pSx)	<u>Inst.</u> (Si)	<u>Choose</u>
1. any	I	B + Acc.		1
2. any	I	C + Inst.		1
3. any	I	K + Dat.		1
4. any	I		(Si/A1) = II	3
5. any	I		(Si) = IV	4
6. any	I		Si = I	3/4
7. I	I			1/3
8. II, III, IV	I, III			3/4
9. any	II	Y + Gen.		1
10. any	IIB1(b)(1)			3
11. any	IIB4, 5, III			2
12. any	II		Si = Instrument	1
13. any	II	C + Inst.		1
14. IV	II			2
15. I, III	II			1
16. II	II			1/2
17. any	IVAS			3
18. IV	IV			2/3
19. I, II	IV			1/3

a) При таком круговороте вода захватывает с собой камни.

The underlined kernel pattern can be symbolized as Sn V pS1 Sa. Sn = ВОДА = water has the tag IIA1-8-o; pS = с собой = "с" + Inst.; Sa = КАМНИ = stones = IIB2. The pattern is
Sn(IIA1-8-9) V Sa(IIB2) pS(c + Instr.)

When this pattern is matched against those in the program, it is seen to correspond to pattern 13: Sn (any) V Sa(II) pSx (c - Inst), and does not fit any patterns above 13. The first equivalent "to take" is chosen.

b) Желудок захватывает добычу широко раскрывающимся ртом.

Symbolically the pattern is Sn V Sa Si. Sn = желудок = stomach = IIB2(c)(2); Sa = добычу = yield/extraction/prey = II; Si = ртом = mouth = IIB2(c)(1). The pattern Sn(IIB2(c)(2)) V Sa(II) Si(IIB2(c)(1)) corresponds to pattern of the program 12: Sn any SaII Si instrument¹²

c) личинки майского жука захватывают в кишечник землю.

Sn V pS Sa. Sn = личинки = larvae = IB, Sa = землю = soil = IIA5, pSx = B + Acc. The pattern Sn (IB) V Sa(IIAS) pS(B + Acc) matches No. 15 of the program: Sn(I) V Sa(II), and the choice of equivalent 1 is made.

d) Движение частиц в этом случае захватывает только ближайший к поверхности тонкий слой воды.

The kernel pattern is represented by symbols Sn V Sa. Sn = движение = movement = IVB, Sa = слой = layer/lamella = IIB2(c). This pattern, Sn(IVB) V Sa(IIB2(c)) matches program pattern 14: Sn(IV) V Sa(II); and equivalent 2, "to include" is chosen.

e) Столкнувшись с атомами, эти фотоны захватываются ими частично или полностью.

In this sentence there are two problems which need explanation. First the assumption must be made that recognition procedures will permit establishing the relationship between "ими" and "атомами." Secondly, the kernel pattern of this sentence is in the passive construction, and the program for "захватывать" is worked out for active constructions only. This procedure was followed for all the verbs, i.e., if the reflexive form of the verb represents only the passive of the non-reflexive, no special programs were worked out. To use the programs for the reflexive verbs, the Sa column becomes the Sn column; and Sn becomes Si. The following formula results:

1 2 2 1
Sn V Sa Sn Vr Si.

The kernel pattern that must be compared with the program is: Sn = АТОМЫ = atoms = II, V = ЗАХВАТЫВАЮТ, Sa = ФОТОНЫ = photons = II, i.e., Sn(II) V Sa(II). This matches pattern 16 of the program, which does not result in a clear choice but narrows the choice from four to two possibilities: (to)-take/include. In the passive construction, Sn Vr Si, the kernel pattern translation becomes "photons (are) taken/include by the atoms."

The results of the syntactic and semantic analysis of the 97 verbs with multiple alternatives are now presented. This material falls into two parts. The first part is a key to the semantic categories of substantives. As explained above, these categories were developed in the course of analysis and seem to be essential to the pinpointing of intended meaning. The second part is a display in tabular form of the programs elaborated for all the 97 verbs with multiple alternatives. In most cases a unique solution of intended meaning was attained, but in some few cases the reader will note that even a combination of syntactic and semantic information could not remove ambiguity. The material presented here is complete only if every pattern in which these verbs can appear has been considered. Since absolute completeness is highly unlikely, the programs would have to be supplemented or modified each time a new pattern is met. It seems reasonable to assume that in most cases the new pattern would merely have to be added to the original program with a rearrangement of patterns when necessary.

Key to the semantic categories of substantives

I. Animate Things

- A. Human Beings
 - 1. Military-collective Terms
- B. Animals
 - 1. Domestic Birds
- C. Human Beings or Animals

II. Concrete Things

- A. Substances
 - 1. Liquids
 - (a) Organic Excretions
 - 2. Gases
 - 3. Powders
 - 4. Metals
 - 5. Solids
 - 6. Paints, Dyes
 - 7. Catalysts
 - 8. Foods
 - 9. Organic Substances
 - 10. Building Materials

¹²Special category of instrumental.

- B. Objects
1. Man-made Things
 - (a) Cloth Objects
 - (b) Machines
 - (1) Vehicles
 - (2) Parts of Machines
 - (3) Watches, Clocks
 - (c) Paper Objects
 - (d) Nails, Spikes, etc.
 - (e) Photographs, etc.
 - (f) Building Materials
 - (g) Objects that can shoot
 - (h) Objects used in beating
 2. Natural Objects
 - (a) Plants
 - (b) Fruits and Vegetables
 - (c) Parts of Body
 - (1) Orifices
 - (2) Others
 - (d) Unnatural Body Excrescences
 - (e) Celestial Bodies
 - (f) Luminous Objects
 - (g) Dead Organisms
 - (h) Fountains, Springs
 3. Tubular Objects
 4. Space Enclosures
 5. Surfaces
 6. Mines, Mineral Deposits

I. Geographical and Political Terms

- A. Abstract Things
- A. Nonverbal Notions
 1. Forms of Energy
 2. Mathematical Terms
 3. Colors
 4. Written Symbols
 5. Examinations, Tests, etc.
 6. Goals, Points, etc.
 7. Details, Problems, etc.
 8. Disease Words
 9. Branches of Arts and Sciences
 10. Substantives that catch fire or suggest catching fire (e.g., (fire), (dawn))
 11. Geometrical Terms
 12. Expressions used in telling time
 - B. Verbal Notions
 1. Events
 2. Processes

Ambiguous Terms

- A. Quantitative (quantity, sum, etc.) Concepts
- B. Parts of Things (end, middle, etc.)
- C. Classifiers (type, variety, etc.)

The substantives in this category belong to more than one of the above categories. The specific category is determined by the classification of the substantive to which the substantive in category V refers.

1.7 Programs for the Resolution of Semantic Ambiguities

бить 1 2 3 4 5 6
 (to) beat/shoot/break/be-unbalanced₉/strike/kill

P A T #	Sn	Sa	p8x	S1	Sd	MISC.	CHOOSE
1	any	II					3
2	any, Ø	Ival2					5
3	any	Ø					5
4	any	Ø					1/2
5	IIB1(b)(3)	Ø					5
6	IIA1, IIB2(h)	Ø					2
7	IIB1(g)	Ø					2
8	IIB1(h)	Ø					1
9	IIB1(b)	Ø					4
10	any	Ø					2
11	any	any					1
12	any	IB					1/2/6
13	any	any					1

биться 1 2 3 4 5
 (to) struggle/beat/tremble/be#broken/killed

1	I, IIB2(c) I, II		BSe=IV OSa	IIB1 II			3
2	IB						2
3	I, III						5
4	I, III						1
5	II						1
6	IIB2(c)			agent/instr.			4
7	II						2
8							4

браться 1 2 3 4 5
 (to) be-taken//(to) take#up/hold/self//(to) come
 2 3 4 5
 (to) take#up/hold/self//(to) come

1	II, IV			agent		откуда clause	1
2	II, IV						5
3	II, IV						1
4	II, III						2
5	I						3
6	I			instrument			
7	I			IIB2(c)			
				agent			4
							1

беспокоить/побеспокоить/
 обеспокоить 1 2
 (to) worry/bother

1	I, III	I, III					2
2	II, IV	II, IV					2
3	II, IV	I, III					1/2

бродить 1 2
 (to) wander/ferment

1	any	IIB9					2
2	any	any					1

бросать/бросить 1 2
 (to) throw/stop

1	any	any		pSa			1
2	any	IVB					2
3	any	Ø					2
4	any	any				Infinitive	1

бросаться/броситься 1 2 3 4
(to) throw (self)/be-thrown/rush

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	I			I, IIIB1(b), IV			3
2	I			II			1
3	II			any			3
4	I						2
5	II						4
6	I		pSx=I pSx=IIIB2(c) pSx=II				2/4

вести 1 2 3
(to) lead/conduct/take

1	any	IV	oTSg(not followed by дoSg)				3
2	any						2
3	any	I, Ø					1

водить 1 2 3
(to) lead/conduct/raise

1	IB1	IB1					3
2	any	I, Ø					1
3	any	any					1
4	any	IV				Infinitive	2

вестись 1 2 3
(to) be#led/conducted//(to) propagate

1	IV						2
2	IA						1
3	IB						1
4	IB		pSx(p= direction) pSx(p= location)				3

веэти 1 2
(to) transport/be-lucky

1	Ø	Ø			I, III	V=3rd per.sg.	2
2	any	any					1

водиться 1 2 3 4 5
(to) be#led/conducted/raised/found//(to) associate

1	I		cSi=I				5
2	I					Infinitive	1
3	I		pSx(p= direction)				1
4	I					Q=direction	1
5	I			I			1
6	IV						2
7	IB1			IB1			3
8	IIIB2(a),(b)						4
9	I		pSe				4
10	II					Q=place	4

возиться 1 2
(to) be#transported/busy

1	II						1
2	I						1
3	I, III		cSi недSi	agent			2
4	I						1/2

возвращать/возвратить/вернуть

1 2
(to) return/recover

P A T #	Sn	Sa	pSx	S1	Sd	MISC.	CHOOSE
1	any					себе possessive adj. in predicate in agreement with Sn	2
2	any						2
3	any			Ksd		any	1
4	any						1
5	any						1/2

возвращаться/возвратиться/вернуться

1 2
(to) return/be-returned

1	any			agent			2
2	I, IIB1(b) (1), IV II						1
3							2

вертеться

1 2 3
(to) turn-around/revolve/be-turned

1	any					Q=direction (e.g., ОКОЛО, ВОКРУГ, etc.)	2
2	I						1
3	II			agent			3

взвешивать/весить

1 2
(to) weigh/suspend

1	any	IIA	BSe-IIA				2
2	any	any					1

взрывать/взорвать
взрывать/взрвать

1
(to) explode
(to) dig-up

1	any	IIB5					1/2
2	any	any					1

включать/включить

1 2 3
(to) include/switch-on/engage₉₁

1	any	any	Bsa				1
2	any	I, III					1
3	any	IIB1(b)(2)					3
4	I, II	IIA, BI(b), IVAl					2

владеТЬ

1 2
(to) own/have-command-of

1	any			I, III IIB2(c), IV II			1
2	any						2
3	any					Q=quality	2
4	any			II			1

вносить/внести

1 2
(to) bring-in/introduce

1	any	IV					2
2	any	any					1

воспламенять/воспламенить

1 2
(to) ignite/inflame

1	any	IV					2
2	any	II					1

воспринимать/воспринять

1 2
(to) perceive/take

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	any	II					2
2	IIB2(c)	IV					1
3	II	IV					2
4	I, III	IV					1/2
5	IV	IV					1

восстанавливать/восстановить

1 2 3 4
(to) restore/set (up)/reduce

1	any	IV A1 I					3
2	any	II A					1/4
3	any	II					1
4	any	I, III, IV	противсx				2
5	any	I, III, IV					1

вращаться

1 2
(to) rotate/circulate

1	IV						1
2	I IA1, 2, 3						2
3	I IA1, 2, 3						1/2
4	II						1
5	IA						1
6	IA						1
7	IA						2
8	I						1

всасывать/всосать

1 2
(to) suck-in/absorb

1	any	I					1
2	any	IV					2
3	IIB1(b), IIB3	II					1
4	II, III	II, III					2
5	I	II					1/2

встречаться/встретиться

1 2
(to) meet/be-met

1	any				any	V=sg	1
2	any					(dat>nom)	
3	IA					V=sg	2
4	IA					V=pl,	2
5	IA					Q=quality	
6	I			agent		V=pl	2
7	IV					V=pl	1/2
8	II, III					V=pl	2
							2
							1/2

впадать/впасть

1 2
(to) sink/flow

1	I, III, IIB2(c)						1
2	any						2

вскрывать/вскрыть

1 2 3
(to) reveal/open/dissect

1	any	IV					1
2	I	I, IIB2(a), (c), (d), (e)					3
3	any	II					2

выбрасываться/выброситься						(to) be-thrown/jump#out	
P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	II, IV						1
2	I						2
3	I						1
4	I						1/2

выводить/вынести						(to) take-out/raise/derive/depict/exterminate				
						1	2	3	4	5
1	any	any	pSa							1
2	any	Ø								1
3	any	Ø								3
4	any	IIA2, 4, 7								4
5	any	IVB								3/4
6	any	IV								3
7	II	II								5
8	I, III, IV	II								1/5
9	I, III	I, A								1/4/5
10	I, III	IB								1/2/4/5
11	II	IA								5
12	II	I								2/5
13	IV	I								1/5

выгорать/выгореть						(to) burn/fade#out	
						1	2
1	IVA3						2
2	IIA6						2
3	IIB1(a), (c)						2
4	IIB2(a), (c)						2
5	any						1

выдавать/выдать						(to) give#up/out//(to) betray/pose			
						1	2	3	4
1	I	"себя"	зaSa						4
2	II, IV	any							3
3	any	IV							3
4	I, III	I				Ø			3
5	I, III	I				any			1/3
6	I, III	II				Ø			2/3
7	I, III	II				any			1/2/3

выдаваться/выдаться						(to) stick-out/occur//(to) be#given-out/betrayed			
						1	2	3	4
1	I, III				I, III				4
2	I, II, III				II				1
3	II								1
4	II								3
5	IV								2

выделять/выделить						(to) discharge/isolate/allot		
						1	2	3
1	any	IIA1, IVA1						1
2	IIB2	any						1
3	IIA7	any						2
4	any	IV						2
5	any	any						3
6	I, II, III	IIB						2
7	IV	I, II						3

1 2 3 4
выделяться/выделиться (to) stand-out//(to) be#discharged/isolated/alloted

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	any			instrument			1

For equivalents 2,3,4 see ВЫДЕЛЯТЬ (Sn=Si=agent, Sa=Sn)

1 2
выдвигать/выдвинуть (to) move-out/advance

1	any	II					1
2	any	I, III, IV					2

1 2
выверить (to) adjust/verify

1	any	IIB1(b)					1
2	any	IVB					1
3	any	II, IV				+Sg=IIB1(b)	2

1 2
выдувать/вылутить (to) blow (out)

1	any	IIB3					2
2	any	any					1

1 2
вызывать/вызвать (to) cause/call

1	any	II, IV					1
2	any	I, III					2

1 2 3
вызываться/вызваться (to) be#called/caused//(to) volunteer

1	II, IV			agent			2
2	I, III						1
3	I, III						1/3

1 2 3 4 5
выдерживать/выдержать (to) endure/maintain/pass/age₉₂/soak₉₅

1	IV	IIA4					5
2	IV	IIA9					4
3	IV	I, II, IV, Ø					1
4	II	IIA4					5
5	II	I, II, IV, Ø					1
6	I, III	IVAS					3
7	I, III	IV, Ø					1
8	I	IIA4					2/5
9	I	IIA9					2/4
10	I, III	I, II					1/2

1 2 3
выключать/выключить (to) exclude/switch-off/disengage

1	any	I, III					1
2	any	any					1
3	any	IIB1(b)(2)					3
4	any	IIB1(b), IV					2

1 2
выходить/выйти (to) go/come#out

The ambiguity can not be eliminated on the basis of this type of investigation. In English the choice seems to depend on the subject to the speaker and/or the listener.

выпускать/выпустить 1 2 3
(to) let-out/put-out/omit

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	any	I					1
2	II	II, IV					2
3	I, III	IV	иэSg=IV, IIB1(c)				3
4	I, III	II, IV					2

вносить/вынести 1 2 3
(to) take (out)/endure

1	I, III	any	иэSg				1/2
2	any	any					3

вносяться 1 2 3 4
(to) be*taken (out)/endured//(to) rush-out

1	IVA1		иэSg				4
2	IVA1						3/4
3	IIB1(b)(1)						1/2
4	IIB1(b)(1)						4
5	I		иэSg	agent			1/2
6	I		иэSg	agent			1/2/4
7	I						3
8	II						1/2
9	IV		иэSg				1/2
10	IV						1/2/3

выписывать/выписать 1 2 3 4
(to) extract/order/discharge/describe

1	I	IV	иэSg=II, IV				1/4
2	II	IV					4
3	I	IV					4
4	I, III	II					2
5	I, III	I	иэSg=II ₅ , III				2
6	I, III	I					3

вырабатывать/выработать 1 2
(to) produce/work-out

1	any	IVA7, IIB6					2
2	any	I, II, IV					1

выравнивать/выровнять 1 2 3
(to) equilize/level/align

1	any	IIB5, VB					2
2	any	IV					1
3	any	I, II, III					3

выражаться/выразиться 1 2
(to) be-expressed/express-self

1	IV						1
2	I, III						2

вырываться/(вырваться)* 1 2
(to) escape/be-pulled-out/

1	any			agent/ instrument			2/3
2	any						1
* Ambiguity only in the imperfective form.							

вырезать/вырезать

1 2
(to) cut-out/slay

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	any	II, IV					1
2	any	I, III					2

высаживать/высадить

1 2 3
(to) land/set-out/set-off

1	any	II					2
2	any	IAl					1
3	any	I					3

высаживать/высадить

1 2
(to) sit-out/hatch

1	IA	any					1
2	IB	any					2
3	any	Ø					1

выслушать

(to) hear-out/auscultate₅

1	I	II					2
2	III	any					1
3	any	III					1
4	I	IV					1
5	I	I					1/2

высовываться/высунуться

1 2
(to) stick-out/be-stuck-out

1	any			instrument			2
2	IIB						1
3	any						1/2

выступать/выступить

1 2 3
(to) appear/protrude/set-out

1	I, IIB1(b)(1)		KSD			and/or Q _m motion	3
2	I, III, IV						1
3	IIA,B2(e) IIB,V					Q _m otion	2

высыпать

1 2
(to) pour-out/break-out

1	IIB2(d)	Ø	any				2
2	any	Ø	Ø				1
3	Ø	Ø	Ø				2

вытекать/вытечь

1 2
(to) flow-out/emerge

1	II						1
2	IV						2
3	Ø						2
4	Ø		"изгн." "того"			and/or "что" clause	1/2

вытягивать/вытянуть

1 2
(to) extend/pull-out

1	any	any	изг				2
2	I	IIB2(c)					1

ВЫЯСНЯТЬ/ВЫЯСНИТЬ

1 2
(to) clear-up/ascertain

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	any	Ø				subordinate clause	2
2	any	any					1

ГНЕЗДИТЬСЯ

1 2
(to) nest/be-found

1	IB						1
2	any						2

ГОВОРИТЬ

1 2
(to) speak/say

1	any	any					1
2	any	Ø	ОСЕ, ЗАТО, ЧТО				1
3	any	Ø					1
4	any	Ø					2
5	any	Ø					1/2

гореть

1 2
(to) burn/shine

1	II		НАSe _m IIB2(e) НОДSe _m IIB2(e)				2
2	IIB2(e), (f), IV						2
3	I, II, III						1

ГОСПОДСТВОВАТЬ

1 2
(to) rule/prevail

1	any		НадSi				1
2	any						2

ГОТОВИТЬСЯ/ПРОГОТОВИТЬСЯ

1 2
(to) prepare/be-prepared*

*In finite forms this equivalent must be rendered as the appropriate form of "be"
+being-prepared, e.g., is-being-prepared, was-being-prepared, etc.

1	I, III	по, KSD наSa					1
2	I, III						1
3	any					Infinitive	2

ДВИГАТЬСЯ/ДВИНУТЬСЯ

1 2
(to) move/be-moved

1	any			agent			2
2	any						1

ДЕЙСТВОВАТЬ/ПОДЕЙСТВОВАТЬ

1 2
(to) act/function

1	any		наSa				1
2	I						1
3	II, IV						2
4	III						1/2

делать/сделать

1 2
(to) make/do

P A T #	Sn	Sa	pSx	S1	Sd	MISC.	CHOOSE
1	any	I, III, II					1
2	any	IV					1
3	any	IV					1
4	any	IV				Ai	1/2

делиться

1 2
(to) divide/be-divided

1	any			agent			2
2	I						1
3	IIA1, 2						1/2
4	II						1

делаться/сделаться

1 2 3 4
(to) be#made/done//(to) become/happen

1	I			I			1
2	I						3
3	II, III			agent			1
4	II, III, IV					Ai, or A short form	1/3
5	II, III						1
6	IV			agent			1/2
7	IV					Sx	3
8	IV						1/2/4
9	Ø				any		3
10	Ø					Q or A	3
11	Ø						4

добиваться/добыть

1 2
(to) beat-in/dispatch

1	any	II					1
2	any	I					2

добиваться

1 2 3 4
(to) strive-for/gain//be#dispatched/beaten-in

1	any					Sg ²	1/2
2	I						3
3	II						4

докрашивать/докрасить

(to) finish#painting/staining₄/dyeing₉

No elimination on the basis of patterns is possible. The reader must decide on the basis of the context which equivalent is most appropriate. The instrumental agent and/or instrument, as well as the field-of-science numbers, may help to determine the choice.

доходить/дойти

1 2 3
(to) reach/ripen//(to) be-done

1	IIB1(c)						1
2	any						1
3	IIB2(b)						2
4	IIA						3
5	I			IV			2

доводить/довести

1 2
(to) bring/finish

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	any	any					1
2	any	I, IV					1
3	any	IIB4, 5					2
4	any	any					1

доводиться/довестись
*Only with 3rd per. sg. (im)

(to) be#brought/finished//it-(be)-happen*

For equivalents 1 and 2, see **доводить/довести**

5	Ø				any	V=3rd sg., followed by Infinitive	3
---	---	--	--	--	-----	-----------------------------------	---

доставать/достать

1 2 3
(to) get/reach/there-is-enough

1	any	any				Sg ²	1
2	any						2
3	any	Ø					2
4	Ø	Ø				Sg, V=3rd per. sg.	3

доставаться/достаться

1 2
(to) fall/be-gotten

1	any					+Sd	1
2	any						2

доставлять/доставить

1 2
(to) furnish/deliver

1	any	II, III, IV					1
2	any	I					2

драть/подрать

1 2 3
(to) tear/whip/scratch

1	any	I					2
2	IV	any					3
3	any	II					1
4	any	any					3

драться

1 2
(to) fight/be-torn

1	II, IV						2
2	I, III						1
3	I, III						1
4	I, III						2
5	I, III						1/2

дробить/раздробить

1 2
(to) crush/break-up

1	any	I					1
2	any	IV					2
3	any	IIB2(c)					1
4	any	II					2

дрожать

1 2
(to) tremble/vibrate

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	I, IIB2(a), (b), (c) II						1
2							2

думать

1 2
(to) think/intend

1	I, III, Ø		Øse			+Infinitive	1
2	I, III, Ø						2
3	I, III, Ø						1

забивать/забить

1 2 3 4
(to) drive-in/obstruct/beat/fill

1	any	IIB1(d), IVA6					1
2	any	IIB4					4
3	any	IV					2
4	any	Ø					3
5	IV	IA,C					2
6	any	IB					3
7	II	IA,C					3
8	any	IA,C	досмерти				3
9	I	IA,C					2/3

заводить/завести

1 2 3 4
(to) take/start/wind/get

1	any	any	в, на, за Sa, KSd				1
2	any	any				Q-direction	1
3	IV	any					2
4	II	IIB1(b)(1), (2), IV					2
5	II	IIB1(b)(3)					3
6	I	I					4
7	I, III	IV					2
8	I	IIB1(b)(1), (2)					2
9	I	IIB1(b)(3)					3
10	I, III	II					4

есть

1 2 3
is/are/(to) eat

1		any, Ø				auxiliary verb, or adj. compl., or Q	3
2	any=Nom.Sg.	Ø					1
3	any=case other than Nom. Sg.	Ø					2

завязывать/завязать

1 2 3
(to) tie/begin/set

1	IIB2(a)	IIB2(b)					3
2	any	IV					2
3	any	any					1

заговаривать/заговорить

1 2 3
(to) begin-to-speak/cast-spell-over/bore

1	I	Ø					1
2	I, III, IV	II, IV					2
3	I, III, IV	I, III					2/3

задерживать/задержать 1 2 3
 (to) detain/retard/retain

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	I	IVB					3
2	I	IIB1(b)(1)					1
3	I	II					3
4	any	IVA					2
5	II, III, IV	I					1

задерживаться/задержаться 1 2
 (to) be#detained/retained/
 3 4
 retarded//(to) lag

For equivalents 1,2,3 see задерживать (Sa=Sn, Sn=Si)

6	I					4
---	---	--	--	--	--	---

заходить/ зайти 1 2 3 4
 (to) go/drop-in/set/extend

1	IIB2(e)						3
2	I						2
3	I						1
4	IIB1(b)(1)						1
5	II, III, IV						4

заключать/заключить 1 2 3 4
 (to) conclude/contain/confine/put

1	II, IV	any	BSe				2
2	I, IV	II, IV					1
3	I, IV	Ø					1
4	I	I	BSa				3
5	I	II	BSa				4

заключаться/заключиться 1 2 3 4 5
 (to) be#concluded/contained/
 3 4 5
 confined/put//(to) consist

1	IIB1(c), IV			IV=instru.			1
2	Ø						1
3	II, I	BSe					2
4	II	BSa					4
5	IV	BSe=II					2
6	IV	BSe=IV					2/5
7	I	BSa					3

закладывать/заложить 1 2 3 4 5
 (to) stuff/place/mortgage/cover/start

1	IV, Ø	any					1
2	I, II, III	II, IV	в, на, заSa				2
3	I, II, III	II, IV					2
4	I, II	IIB4					1
5	I, II	IIB5, I					4
6	I, III	IIB1, 2(c)					5
7	I, III	II					3
8	I, III	IV					3/5
9	I	I					3/5
10	I	I					3

заканчиваться/закончиться 1 2
 (to) be#terminated//(to) terminate

1	IV						1
2	II						1
3	II						2

закреплять/закрепить

1 2
(to) make-secure/fix

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	any	IIB1(c), (e)					2
2	any	any					1

замедлять/замедлить

1 2
(to) slow-down/delay

1	any	I, II, III, IVB2					1
2	any	IVB1					2
3	any	Ø				Infinitive	2

замуровывать/замуровать

1 2 3
(to) embed/wall#in/up

1	any	IIB4					3
2	any	IIA10					1
3	any	IIB1(f) any					2

замыкать/замкнуть

1 2
(to) close/lock

1	any	II, III, IV					1
2	any	I					2

занимать/занять

1 2 3
(to) occupy/borrow/interest

1	I, II, III	IIB4, 5, III					1
2	IV	IIB4					1
3	I, III	II, IVA7					2
4	IV	I, III					3
5	IV	IV					2

заниматься/заняться

1 2 3
(to) be#occupied/borrowed//(to) catch-fire

1	I, III			instrum.= I, II			1
2	IIB4, 5			instrum.=IV			1
3	IV						1
4	IIA						2
5	IIB						1/3
6	IVA10						3
7	IV						1/2

заносить/занести

1 2 3 4
(to) bring/note/cover/raise

1	I	any		instrument			2
2	II, IV	any		instrument			3
3	any	any	B,кaSa				2
4	I, III	IIB2(c)	IIB4, 5	IIB1(c)			4
5	any	IIB4, 5					3
6	any	I, II					1

записывать/записать

1 2
(to) record/register

1	any	II, IV					1
2	any	I, III					2

заплыть/заплыть 1 2 3 4
(to) float/sail/swim/fill

P A T #	Sn	Sa	pSx	Si	Sd	MISC.	CHOOSE
1	I						2
2	I						3
3	IIIB3, III						4
4	IIIB1(b)(1)						2
5	IIIB2(c)						4
6	II			instrument			4
7	II						1

запутывать/запутать 1 2
(to) confuse/entangle

1	any	I, III	B, OSa	IV			2
2	any	I, III		II			1
3	any	I, III					2
4	any	IV					1
5	any	II					2

засыпеть 1 2 3
засыпать/заснуть 4
(to) cover/fill/pour/
fall-asleep

1	any	I	BSa				1
2	any	II					3
3	any	IIIB4, 2(c)(1)					2
4	any	IIB					1
5	any	IIA					3
6	I, III	Ø					4

затухать*/затухнуть 1 2
(to) damp/be-extinguished

*Imperfective aspect only (to) damp

1	IVB						1
2	II, IVA						2

затягивать/затянуть 1 2 3
(to) tighten/draw/prolong

1	any	IV					3
2	any	I					2
3	Ø	I, II					2
4	any	II	BS, HAsa KSD				2
5	I, II	II					1

захватывать/захватить 1 2 3 4
(to) take/include/catch/captivate

1	any	I	BSa				1
2	any	I	cSi				1
3	any	I	KSD				1
4	any	I		instrum=II			3
5	any	I		instrum=IV			4
6	any	I		agent=I			3/4
7	I	I					1/3
8	II, III, IV	I, III					3/4
9	any	II					1
10	any	IIB1(b)(1)	ySg				3
11	any	IIB4,5, III					2
12	any	II		instrument			1
13	any	II	cSi				1
14	IV	II					2
15	I, III	II					1
16	II	II					1/2
17	any	IVA8					3
18	IV	IV					2/3
19	I, II	IV					1/3

зашить/защитить

1 2
(to) protect/defend

P A T #	Sn	Sa	pSx	SI	Sd	MISC.	CHOOSE
1	I, III	IV					2
2	I, III	I, II, III					1
3	I, III	I, II, III					2
4	II, IV	any	OTSg				1