

NEW YORK STATE LIBRARY

OCT 14 1970

GOVERNMENT DOCUMENTS

Patent Office
Research and Development
Reports No. 16

Newman, Simon M

ANALYSIS OF PREPOSITIONALS FOR INTERRELATIONAL CONCEPTS

Preliminary Study

029.9608

U646

73-2757

no.16

Pan

Prepared by

Simon M. Newman

Staff Member

Office of Research and Development

Patent Office

July 15, 1959



New York State Library

**U. S. DEPARTMENT OF COMMERCE
Frederick H. Mueller
Acting Secretary**

**PATENT OFFICE
Robert C. Watson
Commissioner**

Preface

The author's background of engineering and law has constituted poor equipment for use in resolving some of the vexing language problems which were discovered in planning for mechanization of the Patent Examiners' searches. He has published several times, perhaps prematurely, but each time with the hope, still unfulfilled, that a trained linguist would enter the field. The time has now come when he can no longer wait for someone else to make both a thorough and detailed analysis of the functions of prepositionals, and the concomitant synthesis of relational concepts. This report presents only a small portion of the analysis and synthesis which is being undertaken.

Many of the readers of the previous publications have sent excellent suggestions and comments which have been incorporated into the later reports. The author has decided to impose upon them once more.

Suggestions for additional prepositionals or additional meanings of those listed will be welcomed. Comments on any aspect of this sample, and particularly on scope, organization, or layout, will aid in making the completion and report of this study many times more valuable than it might otherwise be. Sincere thanks is tendered to each of you who has previously commented, and, in advance, to those of you who will respond to this request.

The author is gratefully indebted to Dr. Philip I. Herzbrun, Leonard Cahn, and Richard B. Thomas of the National Bureau of Standards and Dr. Victor H. Yngve of the Massachusetts Institute of Technology who not only encouraged him to undertake this study but continually stimulated and encouraged him in its development. Additionally, the author once again acknowledges the comments and suggestions of his colleagues on the Patent Office staff, particularly those of Don D. Andrews, Director of the Office of Research and Development; Charles G. Smith who contributed to the preliminary study; and Rowena Swanson who commented on and edited the manuscript. The author must add, of course, that he is solely responsible for the published results.

Simon M. Newman

A7302768A

Contents

Preface.....	Page 3
Section I. Introduction.....	5
Section II. Classes of words and word clusters.....	5
A. Prepositions.....	5
B. Prepositionals.....	5
C. Simple prepositionals; phrasal prepositionals.....	5
D. Sandwich prepositionals.....	5
E. Locative interspatial prepositionals (interspatials).....	5
F. Inflectionals.....	6
G. Postpositionals.....	6
H. Prepositional phrases.....	5
I. Phrasal verbs.....	6
Section III. Explanation of symbology.....	6
Section IV. Scope of study.....	7
A. The present study.....	7
B. "Meaning" as applied to prepositionals.....	7
C. Meaning "continuum".....	8
D. Source material.....	8
E. Non-prepositional usages.....	9
F. Organization of section VI.....	10
G. Organization of section VII.....	11
H. Scope of section VIII.....	11
I. Organization of section IX.....	12
Section V. Prepositionals studied and omitted... ..	12
A. Prepositionals studied.....	12
B. Prepositionals omitted.....	12
Section VI. Prepositional analysis.....	12
Section VII. Prepositional analysis—phrasal prepositionals grouped by categories.....	29
Section VIII. Synthetic relational concepts.....	30
Section IX. Thesaurus groupings.....	36
Section X. References.....	38
Section XI. Bibliography.....	38

ANALYSIS OF PREPOSITIONALS FOR INTERRELATIONAL CONCEPTS

Preliminary Study

SECTION I. INTRODUCTION

In the effort to create systems and techniques for mechanizing the search of applications for patents in the U. S. Patent Office, the Office of Research and Development has postulated the existence of *Ruly English*, and has published¹ details of the characteristics which appear in the early development of the language. These characteristics are dictated by the adequacy and preciseness which are required in a patent search system and, in fact, in any information retrieval system where minute details are sought.

In such a system, both the interactions among things and their static interrelations are much more important than the specific details of the individual things themselves. Such notions of interaction and interrelation are expressed by means of two or more *cognate descriptors*. *Distribution*² consists of placing one of these cognate descriptors among the group of descriptors of each related thing. When necessary, these cognate words are polarized to designate the direction of interaction or interrelation. Thus distributed, the notion expresses the relation between the things to which the cognate descriptors apply. Each set of cognate descriptors is collectively known as an *interrelational concept*.

An intensive appraisal of the relationships effected by prepositionals in sentences is expected to yield an appreciable number of interrelational concepts significant to information retrieval. This report presents initial efforts in this direction. The terms which are used in this study for classifying the types of prepositionals and other word clusters are defined in Section II. The scope of the study is detailed in Section IV, and the prepositionals which have been considered are listed in Section V. In subsequent sections, specific prepositionals are analyzed and the synthetic relational concepts integrated from the results of the analysis are presented.

SECTION II. CLASSES OF WORDS AND WORD CLUSTERS

Terms of art which are used in this report to describe particular classes of words are defined in this section. The definitions are accompanied by some elaboration on the origins and characteristics of these terms.

The terms, when first introduced in this section, are italicized. Prepositionals used in the illustrative explanations are underlined.

A. A *preposition* has been defined³ as a word that functions as a connective between *an antecedent* which may be a noun, pronoun, adjective, adverb, verb, or entire phrase; and an *object* which may be a noun or pronoun, or word or phrase used as a noun. However, the present analysis shows that a preposition has a dual role: not only that of a connective which establishes a general relationship between the antecedent and the object, but additionally that of a context enhancer which establishes a varying but more specific relationship.⁴

B. A *prepositional* is a word or phrase which acts as a preposition.

C. This study recognizes only two basic classes of prepositionals. Those which are expressed in a single word, e.g., on, onto, notwithstanding, etc., are termed *simple*. Those which are expressed by two or more words, e.g., antecedent.to, as.against, as.far.as, away.from, etc., are termed *phrasal*. Phrasals will be printed with periods between the words.

D. Particularly troublesome phrasals incorporate classes of adjectives or words which act as adjectives (i.e., *adjectivals*). One group of phrasals of this type exists in a form to which the author has applied the name *sandwich prepositional* or *sandwich*. This type of phrasal consists of two prepositionals separated by at least an adjectival term, e.g., as.far.as; as.distinguished.from. The adjectival term may be modified by one or more adverbs, e.g., as.far.out.as; as.easily.distinguished.from; by one or more adjectival prepositional phrases, e.g., as.far.in.space.as; as.distinguished.in.degree.from; or by both, e.g., as.far.back.in.time.as.

E. A class of prepositionals, which includes both simple and phrasal types, describes various spatial arrangements. Many of the phrasals in this group contain adjectivals which combine an adjective or adjectival phrase of *distance* precedent to a prepositional such as from or to. Since these phrasals per-

form a locative function, they are called *locative interspatial prepositionals*, or *interspatials*. This group includes such prepositionals as near; far.from; three.feet.from; near.to; etc.

F. It has been discovered that certain prepositionals, particularly of the phrasal type, can be compared—in a grammatical sense—in a manner similar to adjectives. For this reason, we have named such prepositionals *inflectionals*. For example, the simple prepositional near gives the following comparative terms:

positive form: near
comparative form: nearer
superlative form: nearest

Many of the sandwich and interspatial phrasals can express comparisons. An example of an inflectional of this type is the sandwich adjectival as...as which can be compared as follows:

positive form: as.(small).as
comparative form: (small)er.than
superlative form: (small)est.of

It will be appreciated that this superlative is somewhat *weak* in that it can only take as an object the word *all*, or a word or words of similar import. Similarly, declension of an interspatial such as ()to, e.g., near.to, gives

positive form: (near).to
comparative form: (near)er.to
superlative form: (near)est.to

Some interspatials cannot be directly inflected but can be grouped as closely related inflected phrasals. For example, the interspatial three.feet.from is closely related to the phrasals three.feet.farther.from and three.feet.nearer.to. Phrasals analogous to superlative forms, i.e., three.feet.farthest.from and three.feet.nearest.to, apparently do not exist in our language.

G. A *postpositional* is a word which serves as a connective and context enhancer between an antecedent and an object, but which is placed after the object. In order to distinguish postpositionals, they are preceded by a virgule, thus: /ago, as in the sentence:

Lincoln died years /ago.

Other postpositionals are /hence, /behind, /ahead, /away, and /back, some of which, of course, may also precede an "object" in the usual manner.

H. A *prepositional phrase* is composed of the prepositional, its object, and any associated object modifiers. A prepositional phrase is *adjectival* when it modifies a noun. A prepositional phrase is *adverbial* when it modifies a verb, an adjective, or another adverb.

I. Words which have been considered prepositions but occur by themselves as verb modifiers and appear immediately following the verb and complement it do not perform any of the functions which are ascribed in this study to prepositionals. This combination of a verb and its complement has been called a *phrasal verb*.⁵ (See Section IV.E. on non-prepositional usages.)

SECTION III. EXPLANATION OF SYMBOLOGY

To distinguish between classes of prepositions and to characterize synthetic relational concepts, particularized typography has been used throughout this report.

As in previous reports on Ruly English,⁶ upper case letters are used exclusively for Ruly words and Roots, e.g., CONCERNABOUT(ABOUTCONCERN); SEPFROM().

Synthesized relational concepts which are complex and ambiguous are expressed in lower case letters, e.g., localong(alongloc); placenear(). (See Section IV.H. concerning the creation of synthesized terms.)

As mentioned above (Section II.C.), the words constituting a phrasal prepositional are joined by periods between the words, e.g., antecedent.to; as.far.as.

The outside terms of a sandwich prepositional are linked together by an ellipsis when specific intermediate words are not included to complete the phrasal, e.g., as...as, as...with.

The postpositional prepositional is identified by an immediately precedent virgule, e.g., /ahead, /hence.

The superscript device is used to separate the different meanings associated with a particular prepositional, e.g., about¹, about², about⁰, about^x. The numbers 1, 2, 3, etc., pertain to unique meanings,

whereas 0 and x designate archaic and non-prepositional usages, respectively. (See Section IV.B. for a discussion of meaning as applied to prepositionals and Section IV.E.5. for amplification of archaic and non-prepositional usages.)

Single words or short phrases have been employed in the analyses of Sections VI and VII to describe the particular prepositional meanings. These words or phrases are joined to the prepositional by a hyphen. To preserve the grouping when a descriptive phrase is used, a colon is inserted between the words of a phrase, e.g., circuit-around; avoid-around; presence:during-at; in:addition:to-aside.from. When a descriptive phrase is used which is a hyphenated grouping in conventional usage, the conventional symbology is retained and the symbology used in this study is added to it. For example, the term vis-a-vis, when used to describe a meaning of the prepositional as.against, is punctuated as follows: vis:a+vis-as.against.

The abbreviations and punctuation adopted for reference citations in Sections VI and VII are explained in subsequent discussion of the organization of Section VI (See Section IV.F.)

SECTION IV. SCOPE OF STUDY

A. The present study. An important way in which we express relationships is by means of prepositionals. It is now apparent that a thorough study of the composite function that prepositionals perform in context must be made. The determination and listing of their meanings, the categorizing of similar meanings of different prepositionals, and the synthesis of these similar meanings into artificially created concepts, will not only anticipate later needs (1) in the construction of Ruly English and its use in information retrieval, but also (2) in the development of coding systems which designate interrelations between codes, (3) in many forms of automatic encoding of unedited text material by means of some heuristic program, (4) in programs for mechanical translation, and (5) undoubtedly in other situations.

Since knowledge was first reduced to writing, language has been continuously enlarged, changed, and molded by both evolution and mutation, these transformations creating new meanings for existing language units. To discover all these meanings, and to prognosticate future changes, is impossible. For this reason it seems clear that a complete list of meanings for any one prepositional can probably never be obtained. Nevertheless, it will be helpful to collect and categorize all that can be reasonably found.

It is expected that the text of approximately 100 patents will be processed in a form capable of use directly as input for a machine. Programs have been written which locate and print out all the occurrences of any desired word in context.⁷ Such a source could generate much grist for the present effort, and would be helpful in furnishing additional illustrations of prepositional use in the expository prose of patents which may be somewhat different from normal usages. It is also possible that such a source may be helpful in examination of the legal usage of prepositionals.⁸

For the purpose of getting outside reactions to the scope and execution of this study at the present time, the analysis has been restricted to all important prepositionals which begin with the letter A, and those synthetic relational concepts suggested by one or more of these terms. The prepositionals which have been analyzed and which have been specifically omitted from the analysis are listed in Section V.

Continued study of prepositionals beginning with other letters than A and the concomitant synthesis of relational concepts is, of course, continuing.

B. "Meaning" as applied to prepositionals. In our attempts to develop interrelational concepts, an exploratory study of some twenty-five prepositions⁹ was made. The study revealed the dual concomitant functioning of prepositions as connectors and context enhancers and specifiers as defined above in Section II.

In the present study, we have applied the term *meaning* to the interplay between these two functions of prepositionals. For example, in the following two pairs of sentences, the same prepositional conveys three different meanings. (The superscripts refer to meanings detailed in Section VI.)

- { (1) They lived across⁴ the park.
- { (2) They marched across² the park.
- { (3) They saw the bridge across³ the river.
- { (4) They saw the castle across⁴ the river.

In the sentences (1) and (2), the prepositional phrase is adverbial; in (3) and (4), adjectival.

In sentence (1), the across⁴ connects the predicate of the sentence lived with the object of the prepositional park; in sentence (4), across⁴ connects the object of the sentence castle with the object of the prepositional river. In both cases, across⁴ additionally conveys the meaning of contraposition-across.

In sentence (2), the across² connects the predicate of the sentence marched with the object of the prepositional park and additionally conveys the meaning of proceed-across. In sentence (3), the across³

connects the object of the sentence bridge with the object of the prepositional river and additionally conveys the meaning extend-across. Clearly, only the words which are connected cause the change in meaning.

In some sentences, there are words (usually verbs) other than those connected by the prepositional which also contribute to the same relational concept, but in each case analyzed, the phenomenon proves to be tautological. For example, in the following pair of sentences:

(1) The boy gets seeds from^a berries.

(2) The boy gets hives from^b berries.

the prepositional phrases

... seeds from^a berries

and

... hives from^b berries

show the connection established by the preposition and the context modification, a source-location meaning for from^a and a cause-effect meaning for from^b. The two meanings can also be partially deduced from the verb independent of the remainder of the sentences, a larger aspect of the meaning being indicated from combination of the verb with the object of the sentence, viz.:

... gets seeds ...

and

... gets hives ...

Some meanings are *complex*, i.e., they may be subdivided into a combination of two or more co-extensive concomitant complementary, or supplementary simpler meanings. These complex meanings are often unique to the recited combination of an action and the complementary prepositional. For example, to of dance to in the sentence

"They danced to the music of Victor Herbert."

means dancing (action) both in accompaniment with and in harmony with.

C. Meaning "continuum." Many times, many or all of the meanings for a prepositional lie along a continuum of meaning. The author's selection of particular points along these continuums was purely arbitrary. These arbitrary meanings, however, attempt to divide the continuums most helpfully for information retrieval, and reflect the judgment and experience of the author.

For a particular prepositional, one or more meanings are occasionally disjoined from the main continuum. More often, two or more disjoined, subsidiary, continuums occur. Analysis of the preposition "about," for example, discloses two disjoined continuums and two disjoined independent meanings, as follows:

About¹, about², and about⁰ are in a continuum showing different degrees of "proximity of location."

About⁵ and about⁶ are part of a continuum of "subject matter."

About³ and about⁴ appear disjoint from each other and from the other continuums.

D. Source material. The dictionary publishers have tried valiantly to detail the meanings of prepositionals in their unabridged works, and one publisher has produced a Handbook¹⁰ devoted, in part, to prepositionals.

Rogers's *Thesaurus* organizes concepts (including prepositionals) into classified categories. The *Thesaurus* had not been used in the author's earlier study of prepositions. In the present study, its use has not always been helpful, since the synonyms it lists are often interchangeable on a very broad and ambiguous level. Occasionally, however, the conceptual categories are limited and explicit, and have proven useful in categorization.

While source books have been of great help in locating many prepositionals, many areas of meaning, and many phrases involving prepositionals, the incisive limits of meaning needed in establishing relationships for information retrieval have not been found.

[See Section IV.F. for a listing of source material for this study.]

E. Non-prepositional usages. One of the vexing problems in this study was the determination of whether a term conventionally categorized as a prepositional is, in fact, used as a prepositional. The following decisions were made:

E.1. When the *categorized term* is utilized to change or to intensify the meaning of a verb, and the word following the categorized term is the object of the changed or intensified verb, this categorized term is not a prepositional and is not included in the prepositional analysis. The categorized term and the verb which is changed or intensified constitute a *phrasal verb* (see Section II.I). For example, in the expression "to back up a truck," *truck* is the object of the intensified, phrasal verb *back up*; whereas in the expression "to back a truck up the alley," the *up* is a true preposition, since *alley* is the object of *up*, and not the object of either the verb *back* or *back up*. Similarly, in the expression "to back up a speaker by giving him moral support," *speaker* is the object of the changed, phrasal verb *back up*. Nor are the underlined words in the following sentences considered prepositionals:

The accountant made out (filled in) a tax form for his client.

He put down the tail gate of the wagon.

She put on make-up.

The tourists drank in the sights.

Heavy expenses ate up the capital.

He tried to shout down the opposition.

He put out the light on the porch. (But in "He looked out the window.", out is a preposition.)

When the categorized term is both simple and followed by a noun, and the words of the sentence are not in inverted order, trueness of the prepositional character of the categorized term may be tested by inverting the sequence of the word and the noun following it. The term which is not used as a prepositional can be inverted, whereas a true prepositional must precede the noun. For example,

He tried to shout the opposition down.

is a possible sentence whereas

He backed the car the alley up.

does not constitute a correct sentence.¹¹

When the categorized term occurs after the noun in a sentence because the sentence has been inverted, this test cannot be applied until the sentence has been reinverted. For example,

I don't know whom she is engaged to.

has the prepositional to after the object *whom*. When reinverted, it becomes

I don't know to whom she is engaged.

Now, in applying the test, the expression

I don't know whom to she is engaged.

obviously does not constitute a correct sentence.

The test is not applicable to sandwich or postpositional type prepositionals.

E.2. When the word to is used as part of an infinitive, it is not a prepositional.

E.3. A sandwich-type phrase, to be a prepositional, must be followed by a noun. For example, the phrase

as good as

is considered prepositional in the sentence

The paper money was considered as good as gold.

but not in the sentence

His knife is as good as lost.

In the first sentence, *gold* is a noun and the object of the phrasal prepositional, but in the second, *lost* is a past participle.

E.4. For postpositional-like terms, the word preceding the term must not be the object of the verb. For example, the term /ahead is considered a postpositional in the sentence

He saw four miles /ahead.

but not in the sentence

He saw the road ahead.

In the latter sentence, *road* is the object of the verb *saw*, and ahead is an adverb. In the first sentence, *four miles* is not the object of the verb *saw*, and can only be the object of the postpositional /ahead.

E.5. Occasionally, one of the source books lists among prepositional meanings one or more which, when closely analyzed, either is not considered a modern usage or is not a prepositional usage. For example, the sentence

The opera lasted above four hours.

demonstrates an archaic usage of the prepositional above, whereas the sentences

He weighs about 125 pounds.

He added around 5 pints to the mix.

show adverbial usages of the words about and around.

For completeness, these referenced usages are noted in the prepositional analysis. (See Section V.F.)

F. Organization of Section VI. The prepositionals are analyzed from the standpoint of the separate meanings associated with them. Each separate meaning for a given prepositional is indicated by a unique number immediately following the prepositional in superscript, e.g., across³.

A meaning attributed to a prepositional by the source books employed in the study which is not considered a modern usage is listed as a "zero" meaning at the end of the analysis of the prepositional (cf. about⁰ at the end of the about's). Equivalent expressions which are believed to truly express this zero meaning are listed thereunder.

A meaning given by a source book as prepositional which proves, on analysis, to be non-prepositional, is listed as an "x" meaning herein (cf. about^x at the end of the about's following about⁰). Examples of the non-prepositional usage and the classification of the term are included.

Source credits are listed for each prepositional meaning. The source materials for this work and the symbols assigned to them are as follows:

- D *Webster's New International Dictionary of the English Language, Second Edition, Unabridged* (1955).
- P *Handbook of Prepositions, Conjunctions, Relative Pronouns and Adverbs* (1953).
- R Extensive notes from the author's early work done at the Patent Office.
- T *Roget's International Thesaurus, New Edition* (1946).

The pertinent sources for each meaning are noted in the manner of the following illustration:

D 3b: P II 7, IV 5: R 18: T 113.5, .7; 228.6

This notation states that the particular meaning is found in part b of the 3rd numbered meaning in the *Dictionary*; in Section II, line 7, and Section IV, line 5, in the *Handbook*; in meaning number 18 in the author's notebook; and in sections 113.5, 113.7, and 228.6 of the *Thesaurus*. Notations *P pi* and *P pp* signify that the phrasal serving as a preposition is listed in the *Handbook* as a prepositional idiom or as a phrasal preposition, respectively.

Failure to find the particular meaning in a source (except in R) is noted by a zero after the symbol for that source in the source credits for the meaning, e.g., D 0. The absence of an entry in R signifies that the meaning was not considered in the earlier study.

G. Organization of Section VII. Since it is difficult to include prepositionals of varying content in the same alphabetic list as prepositionals of fixed form, the prepositionals of varying content have been separately collected in Section VII. The variety, the multiplicity, and the overlapping of these terms have convinced the author that the organization of this section is poorly conceived. Suggestions for bettering the listing of these phrasals are particularly solicited.

The same source material was investigated for these prepositionals as for the prepositionals analyzed in Section VI. The format of Section VI is retained with one major difference. Since only a few references were found to the meanings in Section VII, only those found are indicated. In most cases, the usages quoted in the references were not prepositional.

The sandwich prepositionals are alphabetically arranged according to their "outside" terms, thusly;

as...as, as...in, so...as, so...with.

At the present time, we have not discovered any phrasal interspatials in which the non-inflectional term begins with an A. Since the inflected term may be one of many different terms, it would appear that the best way to arrange this category is alphabetically by the uninflected term, thusly:

(...) from
(...) est of
(...) er than
(...) to

H. Scope of Section VIII. Each of the terms in this section attempts to define a single concept of relation by the recitation of defining sentences, each sentence using a prepositional analyzed in Section VI or VII which appears to have the same meaning as those in the other defining sentences. It is the intention that these sentences, taken together, delimit the meaning of the concept.

As indicated in the Introduction, these concepts are formed of two or more *cognate descriptors* which are distributed with the interrelated things. A concept is expressed in print by a single word synthesized by joining the paired cognates, one of the concepts being enclosed in parentheses, e.g.:

TIMAFOR(AFTIM)

When both cognates are the same, the term occurs only once in the synthesized word, a blank space being left between the parentheses, e.g.:

SEPFROM()^{12, 13}

It occasionally happens that a particular meaning of one prepositional constitutes the cognate of a meaning of a second prepositional. For example, consider a first "thing" surrounded by a second "thing." Since the descriptor amid¹ is applicable to the first "thing" and around² is applicable to the second "thing," around² and amid¹ are cognate descriptors. (See Section VI for the meanings of amid¹ and around².) Hence, when the interrelational concept ABOUT(AMID) is created, around² becomes the ABOUT of the interrelated concept, while amid¹ becomes the -(AMID).

Many of these synthesized relational concepts prove to be complex and ambiguous. For example, in considering the concept "near" applied to the relative locations of San Francisco and Baltimore with respect to Washington, D. C., Baltimore is near Washington, even though the cities are forty miles apart. When the concept is applied to the relative locations of a parked automobile and a curb in a city having an ordinance which decrees that any car parked more than twelve inches from the curb is illegally parked, a car parked eighteen inches from the curb is not near the curb.

The common use of qualifiers without standards of comparison has been discussed previously.¹⁴ The above illustration of the qualifier "near" demonstrates that unbased qualifiers, *in context*, do have meaning. The relational concept placenear(), which can be synthesized for the above illustration, can be considered SPACEFROM(),--combined with the *unbased* qualifier near. When synthesized relational concepts state simple and unambiguous relationships, they can be utilized as *interrelational concepts* in Ruly English and they are printed in upper case, e.g., SEPFROM() for two CONFORMs which have no SUBSTANCE in COMMON.¹⁵ Since neither complex nor ambiguous terms are suitable for Ruly interrelational concepts, they are printed in lower case.

I. Organization of Section IX. The numbered categories of Roget's *Thesaurus* which were referred to in creating Sections V and VI are correlated in this Section with specific prepositionals whose unambiguous meanings are most nearly reflected in the *Thesaurus*. The prepositional groupings are arranged numerically by *Thesaurus* division and subdivision.

The *Thesaurus* entries represent an evaluation of the categories suggested in its Index Guide and by collateral and associated concepts. A more exhaustive study did not appear warranted.

The association of several prepositionals with the same or closely related *Thesaurus* subdivisions was tested for the presence of a relational concept. Only a few relational concepts were indicated by these associations.

SECTION V. PREPOSITIONALS STUDIED AND OMITTED

A. Prepositionals studied

Ablow	Along	As.against
Aboard	Alongside	As.between
About	Alongside.of	As.for
About.at	Along.with	Aside
Above	Amid	Aside.from
Abreast.of	Amidst	As.to
According.to	Among	As.touching
Across	Amongst	At
Adjacent	Analogous.to	At.about
Adjacent.to	Analogous.with	/Away
Adown	Antecedent.to	Away.from
After	Anterior.to	As...as
Against	Apart.from	As...from
/Ago	Apropos.of	As...in
/Ahead	Around	As...to
Ahead.of	As	As...with

B. Prepositionals omitted

Abaft	Agreeably.to	Aslant
Abreast	Aloft	Athwart
Abreast.with	Anent	

SECTION VI. PREPOSITIONAL ANALYSIS

ablow (variant of below)

aboard

aboard¹, presence-aboard

We can continue talking after getting aboard the train.

D 1: P 1: T 0

aboard², alongside-aboard

The tug came aboard the liner.

Becomes: - placenear()

D (adv.) 2: P 2: T 0

about

about¹, surround-about

Bind the rope about the post.

They danced about the mulberry bush.

Becomes:- ABOUT of ABOUT(AMID)

D 1: P I 1: R 1: T 227.3, .5

about², location:at:or:near -about

Have you much money about you?

It seemed good to have a man about the house.

His face appeared the worst thing about him.

D 2, 8: P I 5, IV 1: R 2: T 197.8, .11, .12

about³, random-about

Toys lay strewn about the room.

Come to the point, don't beat about the bush!

The papers were handed about the room.

They moved about the world.

Becomes:- RANDOMLOC of RANDOMLOC(LOCRANDOM)

D 3: P I 2, 4: R 3: T 0

about⁴, time-about

He left the house about midnight.

Becomes:- aproxtim()

D 4: P II 1: R 4: T 0

about⁵, concern-about

He read a book about war.

Don't trouble him about his work.

She finally had her way about cooking and prepared chicken.

She raised a question about his credentials.

Becomes:- CONCERNABOUT of CONCERNABOUT(ABOUTCONCERN)

D 5, 7: P IV 2, 3: R 5: T 9.10

about⁶, engage-about

I must be about father's business.

He went about his work cheerfully.

Becomes:- ENGAGAT of ENGAGAT(ENGAGER)

D 5: P 0: R 7: T 625.7; 676.2

about⁰, proximity-about

cf. about¹

about²

about.at¹

at.about¹

Becomes:- placenear()

D 2: P I 5: R 2: T 0

about^x (an adverb; not a prepositional. See Section IV.E.5.)

measure-about

There were about 45 people present.

He stands about 5' 6" tall.

D 4: P III 1: R 4: T 32.17

brink-about

The dessert appeared about frozen.

He was about to step on a snake.

D 6: P 0: R 6: T 0

about.at

about.at¹, proximity-about.at

The accident occurred about.at the end of the paved portion of the road.

Becomes:- placenear()

cf. aproxtim()

D 0: P 0: T 197.8, .11, .12

above

above¹, vertical-above

Chain Bridge is at right angles to and above the B & O Canal.

The books are piled one above another.

The deflector extends partly above the vibration exciting sharp edge.

The helicopter hovered above the rooftops.

D 1: P I 1: T 206.15, .19

above², tower-above

The mountains towered above the plain.

D 1: P I 2: T 206.15, .19

above³, north-above

The ship sank above the Arctic Circle.

D 0: P I 3: T 0

above⁴, rank-above

Such things remain above our comprehension.

He conducted himself above reproach.

Virtue is above price.

Becomes:- -(RANKAFTER) of AFTERANK(RANKAFTER)

D 2a, b: P IV 2, 3, 4: T 33.7

above⁵, despite-above

His shout was heard above the fury of the gale.

Becomes:- despite of despite(spitewith)

D 2c: P IV 1: T 0

above⁶, quantity-above

The yield was recorded by them as above average for such a process.

The temperature is above the atmospheric boiling point.

Becomes:- SURPASS of SURPASS(INFRAPOS)

D 3: P III 1: T 0

above⁰, time-above

Becomes:- -AFTIM of TIMAFOR(AFTIM)

D 0: P II 1, 2: T 0

abreast.of

abreast.of¹, parallel-abreast.of

The honor guards marched down the street abreast.of the standard bearer.

The diplomatic corps is expected to keep abreast.of the times.

Becomes:- PARALLELOF()

D (under "abreast"): P pp: T 216.5; 236.9

according.to

according.to¹, conformable-according.to

They were seated according.to their rank.

They played contract bridge according.to Goren's rules.

According.to one aspect of the invention...

A musical tone is excited according.to the length and other characteristics of the pipe.

Becomes:- DELINBY of DELINBY(DELINOF)

D a, b: P pi: T 23.7; 82.9, .12; 467.13

across

across¹, intersect-across

The stick lay across the line.

D 1: P 0: T 217.14, .18; 219.9, .12

across², proceed-across

They marched across the bridge.

The thought flit across his mind.

He planed the board across the grain.

She swam across the channel.

His hand swept across the strings.

D 2: P II 1: R 4: T 302.2

across³, extend-across

Their hands reached across the aisle.

The girder lay across the manhole.

D 1: P 0: R 2, 4: T 0

across⁴, contraposition-across

We heard the radio across the street.

They lived across the park.

D 3: P I 2: R 3: T 237.7

across⁵, random-across

Dust spread across the plain.

They saw spots across the face of the sun.

Becomes:- RANDOMLOC of RANDOMLOC(LOCRANDOM)

D 2: P 0: R 0: T 0

adjacent

adjacent¹, proximity-adjacent

A boss is located adjacent the hole.

The tug docked adjacent the liner.

Becomes:- placenear()

D 0: P 0: T 197.8

adjacent.to

adjacent.to¹, proximity-adjacent.to

The barn is situated adjacent.to the house.

Becomes:- placenear()

D 0: P pi: R 1: T 197.8

adown (variant of down)

after

after¹, place after

The cars were lined up, one after another.

Wave after wave came up on the shore.

The refugees followed after the troops.

D 1: P I 1: R 1, 9: T 63.1, .3, .4; 117.1 - .3; 235.14 - .17; 281.3; 622.11

after², search-after

What is he after?

Let us strive after wisdom.

The detective went after the murderer.

D 2,3: P III 2: R 2,9: T 461.16

after³, concern-after

He looked after his employees.

She inquired after her friend.

Becomes:- CONCERNABOUT of CONCERNABOUT(ABOUTCONCERN)

D 3: P III 6: R 2: T 0

after⁴, time-after

We talked after supper.

The item exists in the gel state after it has been desulfided.

Centrifugation after immersion reduces water retention.

The property was divided after his death.

Becomes:- -AFTIM of TIMAFOR(AFTIM)

D 4: P II 1: R 3: T 63.1, .3; 117.3, .4

after⁵, result-after

After their quarrel, they decided to separate.

After the selfish way she acted, who could like her?

After what you said, I should be careful.

Becomes:- HOWBY of HOWBY(BYHOW)

D 5: P II 3: R 4: T 0

after⁶, despite-after

After all our advice, you took a contrary course.

After the best endeavors, one may fail.

Becomes:- despite of despite(spitewith)

D 6: P II 4: T 0

after⁷, rank-after

All large corporations put profits after safety.

After Jean, Dorothy sings best.

What can a man do who comes after the king?

Becomes:- -(RANKAFTER) of AFTERRANK(RANKAFTER)

D 7: P III 1: R 6: T 0

after⁸, model-after

He made a boat after the picture.

His painting is after Rubens.

His actions make him a man after my own heart.

He acted after his kind.

This wind instrument is to be played by mouth after the style of an harmonica.

Becomes:- DELINBY of DELINBY(DELINOF)

D 8a, 9: P III 3, 4: R 5, 7: T 622.11

after⁹, source-after

The plastic is called Bakelite after its inventor.

Franklin was named after the President.

D 8b, 11: P III 5: R 8: T 0

against

against¹, impact-against

The hail beat against the roof.

The ship was dashed against the reef.

Becomes:- IMPACTON of IMPACTON(STRIKER)

D 3: P I 3: R 9: T 179.6; 708.5

against², support-against

He stood leaning against the wall.

He braced himself against the supports.

D 3: P I 2: R 1: T 215.27; 719.3

against³, motion-against

He sailed the ship against the wind.

He swam against the current.

He planed the board against the grain.

D 4: P 0: R 8: T 179.6; 708.5

against⁴, contrary-against

Speeding constitutes a crime against the law.

She acted against my wishes.

He maintained his convictions against all opposition.

D 5: P III 1: R 3: T 0

against⁵, fight-against

They fought against the invader.

They took severe measures against disease.

Becomes:- ATTACKON of ATTACKON(ANTAGAINST)

D 6: P III 2: T 179.6; 708.5

against⁶, prepare-against

The closet was enlarged against future need.

They stored food and fuel against the ravages of winter.

Fabrics are stabilized against dimensional shrinkage.

Be ready against the third day.

He saved his money against old age.

D 7: P II 1, III 6: R 5: T 0

against⁷, ratio-against

They figure their cost rate 10 cents against our 8 cents.

John bet \$5.00 against our \$2.00.

Becomes:- RATIOVER of RATIOVER(UNDERATIO)

D 8a: P 0: R 6: T 0

against⁸, contrast-against

His personality stands out against the mediocrity of others.

The house is beautiful against the background of the sky.

It's my word against his.

D 8b: P I 1, III 5: R 7: T 464.2

against⁹, debit-against

The gift was charged against my account.

Becomes:- (DEBINST) of CREDITO(DEBINST)

D 0: P III 4: T 0

against⁰, facing-against

cf. before

D 1: P I 1: R 2: T 237.4, .7

/ago

/ago¹, time-ago.

Mathematicians stopped using abacuses years /ago.

Becomes:- TIMAFOR of TIMAFOR(AFTIM)

D (adv. and adj.) 0: P 0: T 122.8, .14

/ahead

/ahead¹, time-ahead

Reservations for the conference closed week /ahead.

Becomes:- TIMAFOR of TIMAFOR(AFTIM)

D 0: P 0: T 280.4

/ahead², place-ahead

One could see the road miles /ahead.

Becomes:- SEPFROM()

D 0: P 0: T 234.9; 280.4

/ahead³, quantity-ahead

He quit the tables ten dollars /ahead.

Becomes:- CREDITO of CREDITO(DEBINST)

D (adv.) 3: P 0: T 0

ahead.of

ahead.of¹, place-ahead.of

A man with a flag walked ahead.of the truck of explosives.

The hare jumped ahead.of the tortoise.

D (under "ahead", adv.) 1: P pi: T 234.9; 280.4

ahead.of², time-ahead.of

The train arrived ahead.of schedule.

Becomes:- TIMAFOR of TIMAFOR(AFTIM)

D (under "ahead", adv.) 2: P pi: T 280.4

along

along¹, motion-along

We sailed along the coast.

The convoy traveled along the route.

Current passed along the wire.

D 1: P I 1: T 200.15; 282.4

along², place-along

The road follows along the boundary.

Frank stretched the rope which was already extended along the bulwark.

The skin shows a break along its juncture with the secondary portion.

Becomes:- localong of localong(alongloc)

D 1: P 0: T 200.15

along³, random-along

We passed a number of gas stations along the road.

Becomes:- RANDOMLOC of RANDOMLOC(LOCRANDOM)

D 2: P I 2: T 200.15

along⁴, time-along

He made notes along the course of the debate.

Little progress was apparent along the track of centuries.

D 0: P II 1: T 282.4

alongside

alongside¹, proximity-alongside

The boat lay alongside the quay.

Becomes:- placenear()

D 1: P 0: R 1: T 216.5; 236.9

alongside², rank-alongside

Industry and Commerce have followed science in acquiring academic rank alongside the older learned studies.

Becomes:- PARALLELOF()

D 2: P 0: T 216.5

alongside.of (colloquial for alongside)

along.with

along.with¹, in:addition:to-along.with

The sauce was added along.with some salt.

Bob was there along.with Joe and Harry.

Becomes:- ALONGWITH()

D (under "along," adv.) 3: P 0: T 37.9, .10; 88.9

amid (variants: amidst, mid)

amid¹, surround-amid

The village peeped out amid the trees.

Becomes:- -(AMID) of ABOUT(AMID)

D 1: P I 1: T 41.11; 228.13

amid², concomitant-amid

He worked unheeding amid the noise and bustle.

Becomes:- despite of despite(spitewith)

D 1: P II 1: T 41.11; 228.13

amid³, against-amid

He stood firm amid temptations.

D 0: P II 2: T 228.13

amidst (variant of amid)

among (variant: amongst)

among¹, intermingled-among

The houses were hidden among the trees.

There were immigrants among us.

He was just one among thousands.

Aftertreatment involves the difficulty, among others, that agents do not readily penetrate.

Becomes:- RANDOMLOC of RANDOMLOC(LOCRANDOM)

D 1, 2, 3: P I 1, 2, 3; II 1, 2: R 1, 2, 3: T 41.11; 228.13

among², pre = eminent-among

He was an actor among actors.

Becomes:- SURPASS of SURPASS(INFRAPOS)

D 3: P 0: T 41.11; 228.13

among³, diffuse-among

Discontent spread among the ignorant.

D 5: P 0: T 41.11; 228.13

among⁴, share-among

The gold was divided among the heirs.

Profits were split among the gang.

D 6, 7: P II 3: R 4: T 0

among⁵, mutual-among

They quarreled among themselves.

The contest was among three colleges.

D 8: P 0: R 5: T 228.13

among⁶, usage-among

Among intellectuals, it was the custom to sneer at jazz.

D 0: P II 4: T 0

among⁷, alternate-among

He chose dessert among pies, cakes, and several flavors of ice cream.

Becomes:- OUTFROM of OUTFROM(FROMOUT)

D 0: P 0: R 6: T 0

amongst (variant of among)

analogous.to

analogous.to¹, similarity-analogous.to

The location of a word on a drum is identified by a system of addresses analogous.to the system used for core storage.

D (under "analogous," adj.) 1: P 0: T 17.10

analogous.with

analogous.with¹, similarity-analogous.with

The use of alcohol in the process of extracting juniper berries is analogous.with the use of hot water in the making of tea.

D (under "analogous," adj.) 1: P 0: T 17.10

antecedent.to

antecedent.to¹, time-antecedent.to

God warned Noah antecedent.to the deluge.

Becomes:- TIMAFOR of TIMAFOR(AFTIM)

D (under "antecedent," adj.) 1: P 0: T 116.3

anterior.to

anterior.to¹, time-anterior.to

Laplace, anterior.to Einstein, noted many of the phenomena on which Einstein later built his theories of relativity.

Becomes:- TIMAFOR of TIMAFOR(AFTIM)

D (under "anterior," adj.) 2: P pi: T 116.4

apart.from

apart.from¹, distinguish-apart.from

Only his mother could tell him apart.from his twin.

D 0: P pi: T 0

apart.from², separate-apart.from

The poor ewe could not exist apart.from the flock.

Becomes:- SEPFROM()

D 0: P pi: T 44.12, .14

apart.from³, in:addition:to-apart.from

I had no knowledge of his plans apart.from the meager letter he had sent me.

Becomes:- ALONGWITH()

D 0: P pi: T 0

apropos.of

apropos.of¹, consideration-apropos.of

Apropos.of our talk last night, have you now come to some decision?

Becomes:- DELINBY of DELINBY(DELINOF)

D (under "apropos," adv.) 2: P pi: T 9.10; 134.11

apropos.of², pertinent-apropos.of

Have you discovered any prior references apropos.of the contemplated project?

Becomes:- PERTO of PERTO(OPPERT)

D 0: P pi: T 23.11, .13

around

around¹, circuit-around

We traveled completely around the world from East to West.

D 1, 3: P 1: T 227.3, .5; 311.3

around², ring-around

He cast a radiance around him.

A field of force exists around either end of a magnet.

The path around the lake is like a beautiful halo.

Dehydration forms a skin around a plastic core.

A magnetic field was detected around the wire.

Becomes:- ABOUT of ABOUT(AMID)

D 4: P 2: T 227.3

around³, avoid-around

He got around the difficulty by going back to Chicago.

D 0: P 3: T 623.6

around⁴, continue-around

They were married in the church around the corner.

The house can be seen around the bend of the road.

Air is drawn around the sharp edge into the duct.

D 5: P 4: T 0

around⁵, random-around

He wandered around the country.

There are many bad street intersections around the city.

Becomes:- RANDOMLOC of RANDOMLOC(LOCRANDOM)

D 2, 5: P 5: T 0

around⁶, nearby-around

Trees stood around the grave.

He lives around the neighborhood.

Becomes:- placenear()

D 2: P 0: T 197.8, .11, .12; 227.5

around^x

measure-around (an adverb; not a prepositional. See Section IV.E.5.)

The load weighs around three tons.

D 6: P 0: T 32.15, .17; 197.12

as

as¹, manner-as

The audience rose as a man.

He doesn't eat breakfast as a rule.

Resistance disappeared as chaff before the wind.

D 1, 2b: P 0: R 5: T 0

as², characterized-as

Barrymore appeared as Hamlet.

As a bachelor, he can expect no special consideration.

Entertainment was listed as a cost of operation.

He regarded printing as an expensive mode of reproduction.

He operated buses as an experiment.

His plans were accepted and transmitted as instructions.

Cellulose acetate had an acetyl value of 18% calculated as acetic acid.

"Monoamide" is intended as a generic expression.

The reaction product may be incorporated as such in the viscose.

D 2: P 0: R 1: T 0

as³, duty-as

His position as editor made it difficult for him to demur.

She acted as teacher in his absence.

The zero position acts as the sign of the word.

D 2a: P 0: R 2: T 0

as⁴, cause-as

He limps as a result of the accident.

Becomes:- HOWBY of HOWBY(BYHOW)

D 1: P 0: R 3: T 0

as.against

as.against¹, vis-a-vis-as.against

One takes the opinion of lawyers as.against laymen.

Becomes:- RATIOVER of RATIOVER(UNDERATIO)

D (under "as") 2c: P pp: R (under "as") 4: T 237.7

as.between

as.between¹, discriminate-as.between

As.between a home in the country or an apartment in the city, he chose the country home.

Becomes:- RATIOVER of RATIOVER(UNDERATIO)

cf. between

D (under "as," prep.) 2c: P pp: T 0

as.for

as.for¹, concern-as.for

As.for me and my house, we shall obey the law.

Becomes:- CONCERNABOUT of CONCERNABOUT(ABOUTCONCERN)

D (under "as," adv.) "-as for": P pp: T 9.10

as.to

as.to¹, concern-as.to

As.to John's feelings, we could only guess.

Becomes:- CONCERNABOUT of CONCERNABOUT(ABOUTCONCERN)

D (under "as," adv.) "-as to" a, b: P pp: T 9.10

as.to², according-as.to

As.to theory, the diameter could be smaller than that used by the designer.

Becomes:- DELINBY of DELINBY(DELINOF)

D (under "as," adv.) "-as to" b: P pp: T 0

as.to³, proportion-as.to

As.to the length of the mast, the extreme strength of the alloy permitted an extremely small cross section.

Becomes:- RATIOVER of RATIOVER(UNDERATIO)

D (under "as," adv.) "-as to" c: P pp: T 0

as.touching (variant of touching)

aside (variant of beside)

aside.from

aside.from¹, in:addition:to-aside.from

Aside.from the inconvenience it might cause, the question of his right to refuse to act had to be considered.

Becomes:- ALONGWITH()

D (under "aside," adv.) 5: P pp: T 0

at

at¹, spot-at

The hole at the center of the circle was caused by the compass.

The surface at the bottom of the sea was explored.

A sharp edged lip was provided at the termination of the canal at the mouth.

D 1a: P I 1: R 1: T 0

at², proximity-at

The car arrived at the door.

He was seated at the table.

As the sun rose, they found help at hand.

Jean's sweater was frayed at her elbows.

Becomes:- placenear()

D 1a: P I 2: R 1, 8: T 0

at³, found-at

They live at 3 Chester St.

She can be called at her office.

D 1f: P 0: T 0

at⁴, impact-at

He knocked at the door.

Becomes:- IMPACTON of IMPACTON(STRIKER)

D 1a, 2e: P I 2, 7: T 0

at⁵, cause-at

He winced at the thought of learning.

He became merry at the sight of land.

He showed anger at her rudeness.

Becomes:- HOWBY of HOWBY(BYHOW)

D 5: P I 4, IV 7: R 9

at⁶, away-at

He hit the bull's-eye at 30 yards.

Becomes:- SEPFROM()

D 2d: P I 5: T 0

at⁷, thru-at

The boat shipped water at the seams.

His arms protruded at the elbows.

Smoke escaped at the windows.

Becomes:- localong of localong(alongloc)

D 2a: P I 8: T 0

at⁸, synchro-at

The plane leaves at midnight.

Citizens become voters at 21 years of age.

The reactive monomer may be added at any time.

Becomes:- SYNCWITH()

D 7: P II 1: R 7: T 0

at⁹, presence:during-at

He was introduced to her at lunch.

They learned patience at college.

D 1e: P I 4, II 2: R 1: T 0

at¹⁰, range-at

The bank pays interest at 2%.

The meeting was called at short notice.

The car was running at full speed.

An increase to a weight at which the compound cannot diffuse reduces loss.

D 5, 6: P III 1: R 3: T 0

at¹¹, status-at

The stag at bay had drunk his fill.

A nation at war is sometimes desperate.

The numbers were picked at random.

He felt himself at a disadvantage.

D 4: P IV 1: R 5: T 0

at¹², toward-at

He was angry at his friend.

Drowning men catch at straws.

He did not aim at the heart.

D 2e: P I 6, IV 2: R 2: T 0

at¹³, responsible-at

The guilt was laid at his door.

The report was prepared at his command.

She pleaded for justice at his hands.

D 5: P IV 3, 5: R 6: T 0

at¹⁴, employed-at

He works at the Census Bureau.

D 3: P IV 6: R 4

at¹⁵, engaged-at

He was seen at work on Thursday.

He struggled at the controls.

Becomes:- ENGAGAT of ENGAGAT(ENGAGER)

D 3: P IV 4: T 0

at.about

at.about¹, proximity-at.about

The accident occurred at.about the end of the paved portion of the road.

Becomes:- placenear()

cf. aproxtim()

D 0: P 0: T 197.8, .11, .12

away

/away¹, time-away

The dawn seemed hours /away.

Becomes:- AFTIM of AFTIM(TIMAFIT)

D 0: P 0: T 0

/away², place-away

They heard the explosion miles /away.

Becomes:- DISTLOC of DISTLOC(LOCDIST)

D (adv.) 9; (adj.) 1: P 0: T 196.5, .6

away.from

away.from¹, separate-away.from

He lives away.from home.

On vacation he found himself away.from the cares of his office.

Becomes:- SEPFROM()

D (under "away," adj.) 1: P 0: T 187.16

SECTION VII. PREPOSITIONAL ANALYSIS-PHRASAL PREPOSITIONALS GROUPED BY CATEGORIES

as...as

as.x.as, at least so x, or not x-er than

Note: This expression compares x with the object of the second "as." x may be any true adjective, but not all adjectivally used words.

The metal surface became as.bright.as a mirror by polishing.

No planet comes as.near.as Mars at perhelion.

They predicted weather conditions as.far.ahead.as Thursday.

Even in its unpurified form, tritium was approximately three times as.heavy.as hydrogen.

Exceptions

as.well.as¹, along:with-as.well.as

Mollie, as.well.as Jack, was invited to the party.

Becomes:- ALONGWITH()

D (under "as," adv.) "-as well as": T 37.9, .10; 88.9

as.good.as^x (an adverb; not a prepositional. See Section IV.E.5.)

nearly-as.good.as

The repaired machine was as.good.as new.

D (under "as," adv.) "-as good as": T 197.12

as...from

as.x.from¹, x-from-whence

Ethanol, as.distilled.from fermented mashes of organic material, is denatured by the addition of methanol.

as x.from², x-with-respect-to

Single words, as.distinguished.from phrases, clauses, and sentences, cannot be considered context.

as...in

as x.in, x-amid (x-within)

Iron, as.found.in ore, is usually in oxide form.

Language, as.included.in the study of programming, differs from the usual conception of the term.

as...to

as x.to, x-against

As.compared.to drinking, smoking may have worse results.

Frame dwellings, as.opposed.to brick dwellings, are less fire resistant.

as...with

as x.with, x-against

For retrieval purposes, digital computers have some advantages as.compared.with analog computers.

T 464.7

SECTION VIII. SYNTHETIC RELATIONAL CONCEPTS

ABOUT of ABOUT(AMID)

about ¹	Bind the rope <u>about</u> the post.
around ²	A field of force exists <u>around</u> either end of a magnet.

--(ABOUTCONCERN) of CONCERNABOUT(ABOUTCONCERN)

AFTERANK of AFTERANK(RANKAFTER)

before	Large corporations put safety <u>before</u> profits.
over	Aluminum construction is preferred <u>over</u> wood.

--(AFTIM) of TIMAFOR(AFTIM)

above ⁰	The show lasted <u>above</u> three hours.
after ⁴	The property was divided <u>after</u> his death.
/away ¹	The dawn seemed hours <u>/away</u> .
from	Countdown will start ten minutes <u>from</u> now.
in	The showing will begin <u>in</u> an hour.
till	Wait <u>till</u> the sun shines.

--(alongloc) of localong(alongloc)

ALONGWITH()

along.with ¹	The sauce was added <u>along.with</u> some salt.
apart.from ³	I had no knowledge of his plans <u>apart.from</u> the meager letter he had sent me.
aside.from ¹	<u>Aside.from</u> the inconvenience it might cause, the question of his right to refuse to act had to be considered.
as.well.as ¹	Mollie, <u>as.well.as</u> Jack, was invited to the party.

--(AMID) of ABOUT(AMID)

amid ¹	The village peeped out <u>amid</u> the trees.
-------------------	---

aproxtim()

about ⁴	He left the house <u>about</u> midnight.
close.to	The dispute began <u>close.to</u> the end.
near	The crash occurred <u>near</u> daylight.
near.to	The rain stopped <u>near.to</u> midafternoon.
nigh.to	The filibuster ended <u>nigh.to</u> dawn.

cf. placenear()

ATTACKON of ATTACKON(ANTAGAINST)

against ⁵	They fought <u>against</u> the invader.
amid ³	He stood firm <u>amid</u> temptations.

--BYHOW of HOWBY(BYHOW)

for	Books <u>for</u> learning are readily available.
of	A quick method <u>of</u> addition is based on logic.
to	The concrete succumbed <u>to</u> the force of the electric hammer.
resulting.in	Careful tooling <u>resulting.in</u> good products is worth the cost.

CONCERNABOUT of CONCERNABOUT(ABOUTCONCERN)

about ⁵	He read a book <u>about</u> war.
after ³	He looked <u>after</u> his employees.
as.for ¹	<u>As.for</u> me, I shall attend the lecture.
as.to ¹	<u>As.to</u> John's feelings, we could only guess.
for	So much for that.

of	His boast <u>of</u> achievements was based on fact.
on	Labor and management agreed <u>on</u> price.
over	A dispute <u>over</u> the past is fruitless.
with	They are pleased <u>with</u> the results.

CREDITO of CREDITO(DEBINST)

/ahead ³	He quit the table ten dollars <u>/ahead</u> .
---------------------	---

--(DEBINST) of CREDITO(DEBINST)

against ⁹	The gift was charged <u>against</u> my account.
----------------------	---

DELINBY of DELINBY(DELINOF)

according.to ¹	They were seated <u>according.to</u> their rank.
after ⁸	He acted <u>after</u> his kind.
apropos.of ¹	<u>Apropos.of</u> our talk last night, we reached a decision.
as.to ²	<u>As.to</u> theory, the diameter could be smaller than that used by the designer.

--DELINOF of DELINBY(DELINOF)

despite of despite(spitewith)

above ⁵	His shout was heard <u>above</u> the fury of the gale.
after ⁶	<u>After</u> all our advice, you took a contrary course.
amid ²	He worked unheeding <u>amid</u> the noise and the bustle.
despite	He charted the course <u>despite</u> the fog.
in.spite.of	The mail was delivered <u>in.spite.of</u> the blizzard.
notwithstanding	He flew home <u>notwithstanding</u> the flak.
through	His voice was heard <u>through</u> the din.

DISTLOC of DISTLOC(LOCDIST)

/away ²	They heard the explosion miles <u>/away</u> .
--------------------	---

ENGAGAT of ENGAGAT(ENGAGER)

about ⁶	I must be <u>about</u> my father's business.
at ¹⁵	He struggled <u>at</u> the controls.

--(ENGAGER) of ENGAGAT(ENGAGER)

--(FROMASID) of ASIDFROM(FROMASID)

--(FROMOUT) of OUTFROM(FROMOUT)

HOWBY of HOWBY(BYHOW)

after ⁵	<u>After</u> their quarrel, they decided to separate.
as ⁴	He limps <u>as</u> a result of the accident.
at ⁵	He winced <u>at</u> the thought of learning.
because.of	Silver becomes dull <u>because.of</u> wear.
for	He was punished <u>for</u> stealing.
from	He reasoned <u>from</u> the facts.
in	The program was sketched <u>in</u> outline.
of	Nothing can move <u>of</u> itself.
over	They waged war <u>over</u> Helen of Troy.
resulting.from	The cure <u>resulting.from</u> an operation is often permanent.
through	Statehood was established <u>through</u> legislation.
to	The door succumbed <u>to</u> the force of the blow.
with	One can be killed <u>with</u> kindness.

cf. MEANSBY(MEANSOF)

IMPACTON of IMPACTON(STRIKER)

against ¹	The hail beat <u>against</u> the roof.
at ⁴	He knocked <u>at</u> the door.
on	He beat <u>on</u> the drums.
upon	The cat fell <u>upon</u> his prey.

--(INFRAPOS) of SURPASS(INFRAPOS)

localong of localong(alongloc)

along ²	The road follows <u>along</u> the boundary.
at ⁷	The boat shipped water <u>at</u> the seams.

--(LOCRANDOM) of RANDOMLOC(LOCRANDOM)

MEANSBY of MEANSBY(MEANSBYOF)

by	He plays <u>by</u> ear.
by.means.of	Birds fly <u>by.means.of</u> wings.
by.use.of	Sound was projected <u>by.use.of</u> microphones.
from	The picture hangs <u>from</u> a string.
of	The parade started at the sound <u>of</u> the drum.
on	He played <u>on</u> the organ.
resulting.from	The blow <u>resulting.from</u> the hammer was fatal.

through	They spoke <u>through</u> an interpreter.
with	He cut <u>with</u> a knife.

cf. HOWBY(BYHOW)

--(MEANSOF) of MEANSBY(MEANSOF)

-(OFPERT) of PERTO(OFPERT)

OUTFROM of OUTFROM(FROMOUT)

among ⁷	He chose dessert <u>among</u> pies, cakes, and ice cream.
between	He chose <u>between</u> milk and honey.
from.among	He was elected <u>from.among</u> twenty candidates.
in	A pigment is an ingredient <u>in</u> most paints.
of	The sentence will take two years <u>of</u> his life.

PARALLELOF()

abreast.of ¹	The honor guards marched <u>abreast.of</u> the standard bearer.
alongside ²	Cybernetics has acquired academic rank <u>alongside</u> the older learned studies.

PERTO of PERTO(OFPERT)

apropos.of ²	The bibliography contains references <u>apropos.of</u> the project.
to	In his maiden speech before the House, he spoke <u>to</u> the resolutions.

placenear()

aboard ²	The tug came <u>aboard</u> the liner.
about ⁰	
about.at ¹	The accident occurred <u>about.at</u> the end of the paved portion of the road.
adjacent ¹	A boss is located <u>adjacent</u> the hole.
adjacent.to ¹	The barn is <u>adjacent.to</u> the house.
alongside ¹	The boat lay <u>alongside</u> the quay.
around ⁶	He lives <u>around</u> the neighborhood.
at ²	The car arrived <u>at</u> the door.
at.about ¹	The accident occurred <u>at.about</u> the end of the paved portion of the road.
beside	The chair was placed <u>beside</u> the bed.
by	The knife was put <u>by</u> the fork.
near	The clock is <u>near</u> the door.
near.to	The barn is <u>near.to</u> the house.
next.to	The house is <u>next.to</u> the school.
nigh.to	The train drew <u>nigh.to</u> Boston.

on
proximate.to

The house is situated on the shore.
The city is proximate.to the river.

cf. aproxtim()

RANDOMLOC of RANDOMLOC(LOCRANDOM)

about³
across⁵
along³
among¹
around⁵
on
over
through
with

The toys were strewn about the room.
Dust spread across the plain.
We passed gas stations along the road.
He was one among thousands.
He wandered around the country.
He served on the board of directors for three years.
The pebbles scattered over the floor.
Cancer spreads through the body.
They mixed with the crowd.

--(RANKAFTER) of AFTERANK(RANKAFTER)

above⁴
after⁷

Such things remain above our comprehension.
Large corporations put profits after safety.

RATIOVER of RATIOVER(UNDERATIO)

against⁷
as.against¹
as.between¹
as.to³

John bet \$5.00 against our \$2.00.
One takes the opinion of lawyers as.against laymen.
As.between a home in the country or an apartment in the city, he chose the country home.
As.to the length of the mast, the extreme strength of the alloy permitted an extremely small cross section.

SEPFROM()

/ahead²
apart.from²
at⁶
away.from¹

One could see the road miles /ahead.
The poor ewe could not exist apart.from the flock.
He hit the bull's-eye at 30 yards.
He lives away.from home.

--(spitewith) of despite(spitewith)

--(STRIKER) of IMPACTON(STRIKER)

SURPASS of SURPASS(INFRAPOS)

above⁶
among²

The yield was above average for the process.
He was an actor among actors.

SYNCWITH()

at ⁸	The plane leaves <u>at</u> midnight.
by	<u>By</u> noon, the residue will be gone.
down	He has greyed <u>down</u> the years.
for	He worked <u>for</u> one hour.
on	The clock strikes <u>on</u> the hour.
over	He lived here <u>over</u> many years.
through	He goes <u>through</u> life undaunted.
under	The history of the U. S. is recounted <u>under</u> prohibition.
with	Fido barks <u>with</u> the music.

TIMAFOR of TIMAFOR(AFTIM)

/ago ¹	Mathematicians stopped using abacuses years <u>/ago</u> .
/ahead ¹	Reservations for the conference closed weeks <u>/ahead</u> .
ahead.of ²	The train arrived <u>ahead.of</u> schedule.
antecedent.to ¹	God warned Noah <u>antecedent.to</u> the deluge.
anterior.to ¹	Laplace, <u>anterior.to</u> Einstein, noted many of the phenomena on which Einstein later built his theories of relativity.
before	We eat <u>before</u> 6:00 o'clock.
by	The leaves will have fallen <u>by</u> the time winter arrives.

--(UNDERATIO) of RATIOVER(UNDERATIO)

SECTION IX. THESAURUS GROUPINGS

9. <i>Relation</i>	33. <i>Superiority</i>	44. <i>Distinction</i>
.10 about ⁵	.7 above ⁴	.12,.14 apart.from ²
apropos.of ¹		
as.for ¹	37. <i>Addition</i>	63. <i>Sequence</i>
as.to ¹	.9,.10 along.with ¹	.1,.3 after ⁴
	as.well.as ¹	.1,.3,.4 after ¹
17. <i>Similarity</i>		
.10 analogous.to ¹	41. <i>Mixture</i>	82. <i>Conformity</i>
analogous.with ¹	.11 amid ¹	.9,.12 according.to ¹
	amid ²	
23. <i>Agreement</i>	among ¹	88. <i>Accompaniment</i>
.7 according.to ¹	among ²	.9 along.with ¹
.11,.13 apropos.of ²	among ³	as.well.as ¹

116. <i>Priority</i>	206. <i>Height</i>	235. <i>Rear</i>
.3 antecedent.to ¹	.15,.19 above ¹	.14-.17 after ¹
.4 anterior.to ¹	above ²	
117. <i>Posteriority</i>	215. <i>Support</i>	236. <i>Side</i>
.1-.3 after ¹	.27 against ²	.9 abreast.of ¹
.3,.4 after ⁴		alongside ¹
122. <i>Preterition</i>	216. <i>Parallelism</i>	237. <i>Contraposition</i>
.8,.14 /ago ¹	.5 abreast.of ¹	.4,.7 against ⁰
	alongside ¹	.7 across ⁴
	alongside ²	as.against ¹
134. <i>Timliness</i>	217. <i>Obliquity</i>	280. <i>Precession</i>
.11 apropos.of ¹	.14,.18 across ¹	.4 /anead ¹
179. <i>Counteraction</i>	219. <i>Crossing</i>	/ahead ²
.6 against ¹	.9,.12 across ¹	ahead.of ¹
against ³		ahead.of ²
against ⁵	227. <i>Circumjacence</i>	281. <i>Sequence</i>
187. <i>Absence</i>	.3 around ²	.3 after ¹
.16 away.from ¹	.3,.5 about ¹	
	around ¹	282. <i>Progression</i>
196. <i>Distance</i>	.5 around ⁶	.4 along ¹
.5,.6 /away ²	228. <i>Interjacence</i>	along ⁴
197. <i>Nearness</i>	.13 amid ¹	302. <i>Passage</i>
.8 adjacent ¹	amid ²	.2 across ²
adjacent.to ¹	amid ³	
.8,.11,.12 about ²	among ¹	311. <i>Circuity</i>
about.at ¹	among ²	.3 around ¹
around ⁶	among ³	
at.about ¹	among ⁵	461. <i>Inquiry</i>
200. <i>Length</i>	234. <i>Front</i>	.16 after ²
.15 along ¹	.9 /ahead ²	464. <i>Comparison</i>
along ²	ahead.of ¹	.2 against ⁸
along ³		.7 as.x.with

467. <i>Evidence</i> .13 according.to ¹	625. <i>Business</i> .7 about ⁶	708. <i>Opposition</i> .5 against ¹ against ³ against ⁵
622. <i>Pursuit</i> .11 after ¹ after ⁸	676. <i>Undertaking</i> .2 about ⁶	719. <i>Resistance</i> .3 against ²
623. <i>Avoidance</i> .6 around ³		

SECTION X. REFERENCES

1. Andrews and Newman, *Storage and Retrieval of Contents of Technical Literature, Preliminary Report*; Newman, *Storage and Retrieval of Contents of Technical Literature, First and Second Supplementary Reports*; and Newman, *Linguistic Problems in Mechanization*.
2. Andrews and Newman, *op. cit.*, p. 4.
3. Funk and Wagnalls, *Handbook of Prepositions*, p. 3.
4. *This report*, Section IV.B.
5. Funk and Wagnalls, *op. cit.*, p. 4.
6. Andrews and Newman, *op. cit.*; and Newman, *op. cit.*
7. Newman, Swanson, and Knowlton, Patent Office Research and Development Reports, No. 15.
8. Bryant, Margret M., *English in the Law Courts*.
9. Andrews and Newman, *op. cit.*, p. 5, 6.
10. Funk and Wagnalls, *op. cit.*
11. The word inversion test was suggested by Dr. Victor H. Yngve of the Massachusetts Institute of Technology in a personal communication.
12. Andrews and Newman, *op. cit.*
13. Newman, *Storage and Retrieval of Contents of Technical Literature, First Supplementary Report*.
14. *Ibid.*, p. 15.
15. Definitions of some Ruly Roots and interrelational concepts are collected in Appendix A of Newman, *Storage and Retrieval of Contents of Technical Literature, Second Supplementary Report*. Definitions evolved since the issuance of this report have not been published.

SECTION XI. BIBLIOGRAPHY

- Andrews, Don D., and Simon M. Newman. "Activities and Objectives of the Office of Research and Development in the U. S. Patent Office." *Journal of the Patent Office Society*, 40:2 (February 1958) 79-85.
- Andrews, Don D., and Simon M. Newman. *Storage and Retrieval of Contents of Technical Literature—Nonchemical Information—Preliminary Report*. Patent Office Research and Development Report (No. 1). Washington, D. C., Department of Commerce, 1956. (This paper concerns the development of a linguistic approach to the search problem.)

Bryant, Margret M. *English in the Law Courts*. New York, Columbia University Press, 1930.

Dunham, B. "The Formulation of Scientific Languages, Part I: The Work of Woodger and Hull." *I. B. M. Journal of Research and Development*, 1:4 (October 1957) 341-348.

Fernald, James C. *Connectives of English Speech*. New York, Funk & Wagnalls, 1904.

Funk & Wagnalls Editorial Staff. *Standard Handbook of Prepositions, Conjunctions, Relative Pronouns and Adverbs*. New York, Funk & Wagnalls, 1953. (This appears to be a revision of Fernald, *op. cit.*)

Halliday, M. A. K. *The Linguistic Basis of the Thesaurus-Type Mechanical Dictionary and its Application to English Preposition Classification*. (Mimeographed), 1956. (Copy in the Harvard University Library as reference material for applied mathematics courses (Mathematical Linguistics) Nos. 204 and 205.)

Harris, Z. H. "Linguistic Transformations for Information Retrieval." *Preprints of Papers for the International Conference on Scientific Information*. Washington, D. C., National Academy of Sciences--National Research Council, 1958, Area V, pp. 123-136.

Locke, W. N., and A. D. Booth. *Machine Translation of Languages*. Boston, the Technology Press of the Massachusetts Institute of Technology, 1955.

Newman, Simon M. "Linguistics and Information Retrieval; Toward a Solution of the Patent Office Problem." *Monograph Series in Linguistics and Language Studies*, No. 10. Washington, D. C., Georgetown University Press, 1957, pp. 103-111. Reprinted in *Journal of the Patent Office Society*, 39:10 (October 1957) 720-729. (This paper summarizes Office of Research and Development Reports, Nos. 1 and 4.)

Newman, Simon M. *Linguistic Problems in Mechanization of Patent Searching*. Patent Office Research and Development Report No. 9. Washington, D. C., Department of Commerce, 1957. (This paper restates the language problem for the benefit of linguists.)

Newman, Simon M. *Problems in Mechanizing the Search in Examining Patent Applications*. Patent Office Research and Development Report No. 3. Washington, D. C., Department of Commerce, 1956, rev. 1959. (This paper is a statement of the problems which must be resolved in mechanizing the patent search.)

Newman, Simon M. *Storage and Retrieval of Contents of Technical Literature--Nonchemical Information--First Supplementary Report*. Patent Office Research and Development Report No. 4. Washington, D. C., Department of Commerce, 1957. (This paper is a continuation of the linguistic approach described in Report No. 1, *op. cit.*)

Newman, Simon M. *Storage and Retrieval of Contents of Technical Literature--Nonchemical Information--Second Supplementary Report*. Patent Office Research and Development Report No. 12. Washington, D. C., Department of Commerce, 1958.

Newman, Simon M., Rowena Swanson, and Kenneth Knowlton. *A Notation System for Transliterating Technical and Scientific Texts for use in Data Processing Systems*. Patent Office Research and Development Report No. 15. Washington, D. C., Department of Commerce, 1959.

Roget's International Thesaurus, New Edition. New York, Thomas Y. Crowell Co., 1954.

Vickery, B. C. "The Significance of John Wilkins in the History of Bibliographical Classification." *Libri, International Library Review*, 2 (1953) 326-343.

Webster's New International Dictionary of the English Language, Second Edition, Unabridged. Springfield, Mass., G. & C. Merriam Co., 1955.

Yngve, Victor H. "Feasibility of Machine Searching of English Texts." *Preprints of Papers for the International Conference on Scientific Information*. Washington, D. C., National Academy of Sciences--National Research Council, 1958, Area v, pp. 161-169.