A FIVE-YEAR TOPICAL INDEX

The following index has been designed to help the reader easily locate specific examples of wordplay appearing in the first five volumes of Word Ways. It was decided at the outset that an alphabetical index would not do; the field of recreational linguistics is so new that terminology is far from standardized. Nearly everyone knows what an anagram or a palindrome is; fewer people can identify an isomorph or a pangram; almost no one can define a polygram or a switch word. Instead, a topical index has been designed; a taxonomy of wordplay has been set up so that the casual reader can rather quickly move to the relevant section of the index and search through a small collection of closely-related descriptors to find what he wants.

No claim is made that this taxonomy is definitive; it is quite likely that no room has been included for important (but as yet unsuspected) topics in recreational linguistics. Nevertheless, the person interested in understanding how different kinds of wordplay relate to each other should find novel connections and insights.

The index has been made as self-explanatory as possible. The descriptors are intended to be suggestive rather than definitive; however, sample words with the specified property are often given in parenthesis following the descriptor. All references are given in volume-page form; thus, 5-23 refers to the 23rd page in Volume 5 (in the February 1972 issue). Note that relevant material may continue on for several pages.

Readers may be helped by an overview of the way in which the index has been put together. Broadly speaking, words can be classified in three different ways -- by sight, by sound, and by meaning. The emphasis in Word Ways during the first five years has been on words as collections of letters (sight); some attention has been paid to their meaning; relatively little consideration has been given to words as collections of sounds. The imbalance between sight and sound may, perhaps, reflect the fact, well-known to psychologists, that the brain receives much more information through the eye than the ear. Academic linguistic studies place much greater emphasis on meaning than either sight or sound; on the other hand, word puzzles and games (from Carroll, Dudeney and Bombaugh onward) stress sight and sound. Word-puzzles, however, focus on the individual word oddity; one of the major objectives of recreational linguistics has been to integrate these scattered results, to understand how different word properties relate to each other, and to discover (as a result of this integration) new logological world to conquer. The first book on recreational linguistics to attempt a unified approach, Dmitri Borgmann's *Language on Vacation* insights, takes up Word Ways and other books of wordplay.

Although in the book's introduction the topics of natural and conventional wordplay are divided into two parts: Language and Puzzles, it may be noticed that these topics are interrelated in many ways. Although a 2-by-2-by-2 classification system of wordplay can be devised:

1) some word

2) next word

3) further word

4) final word

This suggests a 2-by-2-by-2-by-2 classification system of wordplay. As a result of this integration, novel connections and insights may be produced if one considers different word properties and combinations of those properties as closures.

In general, the final line of this index is as follows:

1) all letters

2) some letters

3) groups

4) alphabetic

5) word

In cryptic ciphers, in substitution ciphers, in unscrambling a personal name, for example, all arrangements given into groups may be transposed into morphs (hence:...
on Vacation, was published in 1965. This index builds on Borgmann's insights, taking advantage of experience gained during five years of Word Ways to attempt a more elaborate and suggestive classification of wordplay.

Although the sight-sound-meaning classification appears to be a natural and useful one, it does not easily embrace all of the articles in Word Ways. Therefore, the index has been divided into two major parts: Language Research (using the sight-sound-meaning classification) and Entertainments (special formats, such as fiction, poetry, puzzles and games; special vocabularies, such as place names, personal names and lists of related words; book reviews and dictionary errors). The remainder of this introductory article will be devoted to an elaboration of the sight-sound-meaning classification.

How can words be classified by sight? At least four dimensions can be distinguished:

1) some properties of words focus upon all the letters in a word whereas other properties focus upon only part of a word -- the letters in the remainder are irrelevant
2) next, one can distinguish between properties involving a single word and properties which can be exhibited only for a group of words (relations of different words to each other)
3) furthermore, one can draw a dichotomy between properties of words in which the alphabetic arrangement of letters plays no role, and properties of words in which this role is essential
4) finally, consider a change of the basic unit: sentences as collections of words instead of words as collections of letters

This suggests that word appearance properties should be displayed in a 2-by-2-by-2-by-2 table; however, many of the boxes in this table would be empty. Accordingly, various boxes have been combined to produce a nested structure:

1) all letters used (single words, alphabet-independent, letter units)
2) some letters used (single words, alphabet-independent, letter units)
3) groups of words (alphabet-independent, letter units)
4) alphabet-dependent (letter units)
5) word units

In general, each line exhibits a successively coarser classification; the final line includes eight boxes of the original table.

In cryptography, two basic cipher systems are used -- permutation ciphers, in which the letters of a message are scrambled, and substitution ciphers, in which the letters of a message are replaced (for example, all A's with C's, all B's with M's, etc.). These two transformations give the logologist two different methods for classifying words into groups according to properties based on all letters: two words can be transpositions (have the same letters), or two words can be isomorphs (have the same pattern). Isomorphic groups of particular in-
that one is interested in a word, a sentence, or even a whole text: for example, one letter appears in five different positions for groups of words that differ only in the same position, e.g., "Crash", or by inserting a word (forming a square, n-polygram). Other groups of words, such as transmorphs (in earlier Word Ways issues, anagrammatic isomorphs) if they have the same number of letters of various kinds; for example, two seven-letter words are transmorphs if they consist of two different letters used twice and three different letters used once. Transmorphs of particular interest are isograms (each letter once), pair isograms (each letter twice), polygrams (each letter at least twice), and pyramids (one letter once, one letter twice, etc.). The study of long words is a limiting case of transmorphs in which one is interested not in the number of letters of each kind, but simply in the number of letters.

What can be said about properties involving some, but not all, of the letters in a word? To begin with, there is a transitional situation in which one is interested not in the pattern of all letters in a word, but only those letters at certain fixed positions in the word -- heads and tails words, words with doubled beginnings and endings, words with specified letters at the beginning and end. This leads to a consideration of various letters in a word without regard to their location in the word -- words containing several rare letters, words containing the five vowels once each, words containing multiple appearances of the same letter. If all letters are present in a word, it is called a pangram. Since no such words exist, a pangram is more often defined as a set of words collectively containing all the letters, usually in a literary format. (However, if no extra letters are present in a pangram, it is more logically classified as an isogram of 26 letters). If single letters of various sorts, why not groups of letters without regard to location -- bigrams, trigrams, repeated bigrams or trigrams, multigrams such as internal palindromes? The groups of letters need not be contiguous -- consider, for example, alternating nonotonies. There is no need to restrict oneself to a study of letters; other symbols, such as hyphens, accents, internal capitals and the like can be catalogued. Finally, one can consider words having the absence (instead of the presence) of certain letters. Since the absence of any letter or group of letters in a single word is hardly noteworthy, most lipograms consist of groups of words in a literary form.

One of the most interesting, and difficult, fields of recreational linguistics is the study of the relationship of groups of words to each other. Many of the single-word problems outlined in the preceding two paragraphs can be solved (at least in principle) by a computer search through a dictionary tape, but it is a much more lengthy job for a computer to assemble a group of words in which each word depends upon the choice of all others. Perhaps the simplest example of a word group is a pair of words differing only in one letter in the same position (as value-value), or differing only in one letter without regard to position (as sexual-squeal). Both ideas can be readily generalized to larger groups. Sequences of words in which each successive pair differs in only one letter in the same position are word ladders, and onalosis and garble groups are nothing but densely-packed word groups in which a maximum number of ladder-first-steps (or full ladders) are possible. Similarly, if transposition is allowed so
If these ideas are exchanged in yet another way, one is comparing the letters in one word with those in another word, a variety of elaborately-structured groups of words is possible: for example, groups in which each m-word subgroup has exactly one letter in common, or groups in which each possible pair of letters appears in exactly n different words. In the limit, one can look for groups of words in which no pair of words has the same letter in the same position (forming the basis of a strategy for the game of Crash), or no pair of words has the same letters regardless of position (forming the basis of a strategy for the game of Jotto).

Other group structures are possible. One broad class (called word steps in the Index) is based on a sequence of letters, all different or with repetition allowed, stretched out in a line or joined head-to-tail in a circle. The objective in all four cases is to form the sequence in such a way that an n-letter-wide "window" sliding along the sequence will always reveal a word (or, more generally, a group of letters transposable into a word). More relaxed restrictions are possible, too. Successive words derived from the sequence can have less overlap, down to the limiting case in which the tail of one word is the start of the next word (this places so little difficulty on the construction that usually additional additions are invoked, such as cycling the overlap letters through the alphabet). A second broad class (called group transpositions in the Index) was originally synonymous with word squares, n-by-n squares of letters which must form words when read in the horizontal or vertical directions (or, more generally, must be transposable to words in the two directions). Word squares, however, have been extensively generalized -- word rectangles, higher dimensions (word cubes), additional restrictions (Latin squares), different rules for building new word groups out of old (pentomino puzzles). Broadly speaking, word squares and their relatives can be regarded as transpositions of groups of words into other groups of words under various rules.

Finally, it is possible to consider groups of words whose members do not all have the same number of letters. Hospitable words, for example, can be transformed into other words by the addition of a suitable letter in any position between letters; charitable words remain words if any letter is deleted. Successive beheadment or curtailment of a word to produce a new word leads to word groups with a triangular (or truncated triangular) structure. More generally, a charade breaks up a word into a group of shorter words. If a letter can be deleted anywhere in the word and the remaining letters transposed to form another word, a transdeletion has taken place; again, successive transdeletions lead to triangular groups of words. The transdeletion index of a word is the minimum number of letters that must be added to a word in order that a new transposed word be formed.

Shifting attention from word groups to alphabetic dependence, one can distinguish two classes of wordplay -- that dependent on the order of the letters in the alphabet, and that dependent upon the scores of the letters (A = 1, B = 2, etc.). The former is genuinely logological, but the latter has been criticized as recreational mathematics masquerading as wordplay. Obviously, it is difficult to draw a firm bound-
ary between these territories. One can look for words which have all their letters from the first half of the alphabet (or, indeed, any shorter segment). It is somewhat easier to look for words containing a group of alphabetically adjacent letters scattered through them, either in random or proper alphabetic order. Letter-scoring leads to a variety of quasi-mathematical exercises, such as numerical tautonyms, difference words, poker words, and centrally balanced beam words. (Other examples in Dmitri Borgmann’s book are shift words and ACE words.)

There are only a few Word Ways examples illustrating the final aspect of the appearance of words: properties based on words as units instead of letters as units. This field of wordplay is so underdeveloped that it is unreasonable to impose a logical structure on it at this time. It seems fairly evident that one cannot classify by analogy with letters as units.

The classification of words according to sound is much less elaborate than that for words according to sight. Earlier, the basic units were letters; now, they are syllables or phonemes. No one seems to have considered using phonemes as surrogates for letters, and repeating the various studies outlined above -- phonetic palindromes, transposals, etc. One difficulty seems to be that the phonetic "alphabet" is rather large (there are many subtle variations in vowel sounds) and ill-defined (one sound can grade continuously into another). Furthermore, regional variations in pronunciation are far greater than regional variations in spelling.

The relationship between letters and syllables has been occasionally explored in Word Ways -- long one-syllable and two-syllable words, as well as words with many syllables per letter. Homonyms (words sounded the same but spelled differently) and heteronyms (words spelled the same but sounded differently) are inverse concepts which can be developed in such surprising ways as homonymic sentence-pairs and heteronymic sentence-pairs.

The classification of words according to meaning is decidedly less satisfactory. Certain topics in this section are related to the structure of language -- how words are related to each other. Just as words can be classified by means of their letters or syllables, so can they be classified by meaning: synonyms and antonyms. In conveying meaning, the structure of language becomes important, and words play many specialized roles: parts of speech, tenses and conjugations, singulars and plurals. Of almost equal importance is the distinction between the objective meaning of a word (as given in a dictionary) and the subjective meaning of a word (how people react to it): connotations.

Other topics are related to the problems that people encounter in communicating thoughts and ideas by means of language. Problems arise in meaning because language is not a static thing: in the words of a well-known language chemist, "One may invent a word and find a word may invent a word..."

THE SIGHT

A. Properties

1. Transpositions

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2. Isomorphism

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3. Anagram
of a well-known Protestant hymn, time makes ancient good uncouth: language change and specialization. In particular, if people cannot find a word in the existing language to express their meaning, they may invent a new one: coinages. Ultimately, language change leads to different dialects and completely different languages, and the problem of communicating meaning is solved in a more formal way: translation. Problems also arise in meaning because language is a human development; it does not always follow a logical set of rules, and contradictions can arise: ambiguities and inconsistencies.

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