

# LONG WELL-MIXED TRANSPOSALS

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A transposal of a word is a rearrangement of its letters into a new word, as CORSET to ESCORT or AGNOSTIC to COASTING. Although the words transposal and anagram are often used interchangeably, this practice is to be deplored. An anagram is a transposal of a word or phrase into another word or phrase which has the same meaning, as ENDEARMENT to TENDER NAME or H. M. S. PINAFORE to NAME FOR SHIP. Anagramming has been practiced for centuries, but transposing has been recognized as a separate art for only the past half-century or so. Although long transposals were published a century ago (the fine ENUMERATION - MOUNTAINEER appeared in the Saturday Evening Post in 1879), transposals are not discussed at all in A Key to Puzzledom, a handbook of wordplay compiled in 1906 by members of The Eastern Puzzlers' League.

By the middle of the 1920s, however, the transposal enjoyed a considerable popularity. Three major articles on transposals appear in the National Puzzlers' League's Enigma of that time (October 1924, December 1924, June 1925). The leading constructor then was Hercules B. McPherrin of Denver, Colorado (1874 - 1953), the first person to discover a considerable number of really long transposals. The first book devoted to transposals, the Nuttall Dictionary of Anagrams, was compiled by A. R. Ball and published by Frederick Warne & Co. in 1937. Apparently Ball did not have access to the National Puzzlers' League work in this field, for the longest transposal in his book is CERTIFICATION - RECTIFICATION, a relatively trivial one which, nevertheless, is the longest one for which both words appear in boldface type in Webster's Pocket Dictionary.

It was early recognized that very long transposals are more likely than not to consist of interchanges of only two or three letters, as CONVERSATION to CONSERVATION, or of large segments of the word, as HYDROPNEUMOPERICARDIUM to PNEUMOHYDROPERICARDIUM or CHOLECYSTODUODENOSTOMY to DUODENOCHELECYSTOSTOMY. (At 22 letters apiece, these are the longest transposals for which both words appear in boldface in Webster's Second.) Much more interesting to the logologist are transposals in which the letters of one word are well-mixed in the second one.

To fix ideas, this article introduces the following definition of well-mixed: a transposal in which no more than three consecutive letters of one word appear as three consecutive letters in the other. For example, consider the transposal NONGEOMETRICAL - INCONGLOMERATE

authored by Murray Pearce in the November 1974 Enigma. The trigrams ONG and OME appear in both words, but there are no other trigram or bigram matches. The quality of this transposal can be succinctly characterized by the number sequence (2,0), denoting the number of trigrams in common followed by the number of bigrams in common. It is possible to find perfectly-mixed transposals in which no bigrams or trigrams in one word are repeated in the other; for example, Murray Pearce's NITROMAGNESITE - REGIMENTATIONS, appearing in the August 1971 Enigma, has this property.

This article lists all known well-mixed transposals of 13 or more letters, giving credit, where known, to the earliest appearance of the transposal. The first of these to be discovered was found by accident. In the September 15, 1906 issue of The Ardmore Puzzler, "Rusticus" posed the anagram IS A REVERTING TO, intending that the answer be TERGIVERSATION. However, "The Poser" came up with the alternative solution INTERROGATIVES. Subsequently, "Alec Sander", an Ardmore assistant editor, sent the pair as a transposal puzzle to the Newark Evening News.

This stood as a record-length well-mixed transposal for nearly twenty years, until Hercules McPherrin proposed the 15-letter pair DECHLORINATIONS - ORNITHOSCELIDAN in the June 1925 Enigma. The first word is an inferred plural of a boldface word in Webster's Second; the second word also appears in boldface in this source. He followed this up in the December 1927 issue with the equally remarkable CINEMATOGRAPHER - MEGACHIROPTERAN.

These in turn stood as record-length well-mixed transposals for almost 50 years, until Charles E. Holding of Silver Spring, Maryland published the 17-letter BASIPARACHROMATIN - MARSIPOBRANCHIATA in the October 1971 Enigma. Notice that these words share one trigram (SIP) and five bigrams (AR, RA, CH, MA and AT), and hence the transposal quality is (1,5); nevertheless, even the most exacting logologist would grant that it is a well-mixed transposal.

The search for transposals is a task ideally suited for a high-speed digital computer. As part of a research project to ascertain the lexical capabilities of the computer, Dennis Ritchie, a member of technical staff of Bell Telephone Laboratories, sorted out the boldface words of Webster's Unabridged (Second Edition) into a transposal dictionary in 1973. In addition, he programmed the computer to construct derived forms of words in boldface in Webster's Collegiate (Seventh Edition), adding these words to the stockpile available for transposal. Letting V stand for a vowel and C for a consonant, his rules for word-formation can be summarized as follows:

- 1) Gerunds: if verb ends in Vc, add -king; if verb ends in CVC with last syllable stressed and final letter not x or w, double the final consonant and add -ing; if verb ends in Ce, drop the e before adding -ing.
- 2) Past tenses: if verb ends in e, add -d; if verb ends in CVC with last syllable stressed and final letter not x or w, double

the final consonant and add -ed; if verb ends in Cy, drop the y before adding -ied; in all other verbs, add -ed.

- 3) Agent nouns: same rules as past tenses, with r replacing d.
- 4) Plurals of nouns, third person singular of verbs: if word ends in s, x, z, ch or sh, add -es; if word ends in Cy, drop y and add -ies; in all other words, add -s.

This program generated a small number of spurious words such as ICEMANS.

The list below was extracted from Ritchie's full list of transposals. The quality of each transposal is indicated by a pair of numbers denoting the number of trigrams and the number of bigrams in common in the two words. Transposals published prior to the computer list (or discovered independently, although not published) are credited.

- 17 basiparachromatin - Marsipobranchiata (1,5) Holding, Enigma  
Oct 1971
- 15 cinematographer - megachiropteran (0,2) McPherrin, Enigma  
Dec 1927
- 14 nitromagnesite - regimentations (0,0) Pearce, Enigma Aug 1971  
rotundifoliate - titanofluoride (0,0)  
prerealization - proletarianize (0,2)  
perturbational - protuberantial (0,4)  
pectinesterase - preecessitate (0,4)  
protomagnesium - spermatogonium (1,2)  
inconglomerate - nongeometrical (2,0) Pearce, Enigma Nov 1974  
§ interrogatives - tergiversation (3,0) "The Poser" "Alec Sander",  
Ardmore Puzzler Sep 1906
- 13 aeolharmonica - chloroanaemia (0,1)  
micranthropos - promonarchist (0,1)  
intermorainic - recrimination (0,1) Darryl Francis  
commercialist - microclimates (0,1)  
interoceptors - retrospection (0,1)  
counterpoiser - reprosecution (0,1)  
parasyntheton - thysanopteran (0,2)  
overcirculate - uterocervical (0,2)  
contrarieties - recreationist (0,2)  
+ personalistic - pictorialness (0,2) McPherrin, Enigma Nov 1941  
micropetalous - somatopleuric (0,2)  
investigation - tenovaginitis (0,2)  
pedometrician - premedication (0,3)  
superintended - unpredestined (0,3)  
hemicatalepsy - mesaticcephaly (0,4)  
iconometrical - intracoelomic (0,4)  
\* disorientater - sideronatrile (0,4)  
superintendent - unenterprised (0,4)  
peridiastolic - proidealistic (0,4)  
hypoglossitis - physiologists (0,5)  
cholesteremia - heteroecismal (1,0)

- Deinocephalia - palaeechinoid (1,1)  
 paraprocitis - participators (1,1)  
 guarantorship - uranographist (1,1) McPherrin, Enigma Mar 1931  
 inoperculates - persecutional (1,1)  
 chlorinations - nonhistorical (1,1)  
 cephalometric - petrochemical (1,2)  
 discriminator - doctrinairism (1,2)  
 protectorates - statoreceptor (1,2)  
 periprostatic - precipitators (1,2)  
 \* disorientater - endoarteritis (1,2)  
 \* endoarteritis - sideronatriite (1,2)  
 redintegrator - retrogradient (1,2)  
 countertrades - unstercorated (1,3)  
 propraetorial - Protoperlaria (2,1)  
 condylomatous - monodactylous (2,1)  
 interceptions - septentrionic (2,2)  
 cryptostomate - prostatectomy (3,0)

Particular attention should be paid to the three starred pairs which taken together form a mutually well-mixed transposal trio. Of the 48 transposal pairs printed out by the computer, only 8 had been previously discovered.

To complete the list of well-mixed transposals, it is necessary to consider those outside the scope of the computer printout -- transposals from other dictionaries, or transposals involving derived forms of words in Webster's Second (but not in the Collegiate). The ones given below are added to the list without question.

- 15 dechlorinations - ornithoscelidan (0,1) McPherrin, Enigma Jun 1925  
 14 phonautographs - anthropophagus (0,1) McPherrin, Enigma Jan 1927  
 13 acetonitriles - intersocietal (0,0) Francis  
 semipectorals - stereoplasmic (0,1) Holding  
 + pictorialness - porcelainists (0,1) McPherrin, Enigma Nov 1941  
 readaptations - tetradiapason (0,3) McPherrin, Enigma Jun 1925  
 characterless - clearstarches (0,4) McPherrin, Enigma Mar 1926  
 ancylotherium - ethylcoumarin (0,4) Francis  
 Cinosternidae - inconsiderate (0,4) Francis, Holding  
 + personalistic - porcelainists (1,0) McPherrin, Enigma Nov 1941  
 cheiropterans - terpsichorean (1,2) "Sol", Enigma Jul 1934  
 conservatoire - overreactions (1,2) Pearce, Enigma Oct 1972  
 disencharming - merchandising (3,0) Francis

All words are in Webster's Second except for PORCELAINIST (Funk & Wagnalls Unabridged), OVERREACTION (Random House Unabridged), ANCYLOTHERIUM (Century Dictionary), and ETHYLCOUMARIN (Hackh's Chemical Dictionary). CHIROPTERAN is in Webster's Second, along with the prefix CHEIRO- listed as a variant of CHIRO-. PECTORAL is listed as both an adjective and a noun, although the boldface listing SEMIPECTORAL does not specify the part of speech. DISENCHARM is in Webster's Second, and MERCHANDISING is listed

in lightface type there. Note that a second mutually well-mixed transposal trio, of higher quality than the first, is marked by + signs.

Some people may also be willing to admit one or more of the following transposals.

15 nonrealisations - siaresinotannol (0,2) Francis

14 misinterpreted - predeterminist (2,3) "Sue Doe", Enigma Jan 1954  
 § reinvestigator - tergiversation (0,3) "Chet", Enigma Jul 1946  
 § interrogatives - reinvestigator (2,2) "Chet", Enigma Jul 1946

13 cartelisation - intercostalia (0,1) Francis

NONREALIZATION is found in Webster's Second, and CARTELIZATION in the Random House Unabridged; it may be reasonable to introduce a British spelling for these words, even though unsupported by American dictionaries. PREDETERMINISM and PREDETERMINISTIC can be found in Webster's Unabridged, as can REINVESTIGATE and INVESTIGATOR. The two-word term SPATIA INTERCOSTALIA can be found in Dorland's Medical Dictionary.

If one allows gerundial plurals of words listed in unabridged dictionaries (EDULCERATINGS, REINUNDATINGS) or archaic endings (REINVIGORATEST), further well-mixed transposals are possible. However, a line must be drawn somewhere, or else one will end up admitting such transposals as HYDROCALUMITES - TRICHLAMYDEOUS. The second word appears in a list of isograms compiled by Jack Levine in 1957 from Webster's Unabridged and a variety of specialized dictionaries. A diligent search failed to reveal such a word, although the somewhat similar words MONOCHLAMYDEOUS and DI-CHLAMYDEOUS do appear. The first word relates to a group of plants in which the flowers have no petals; the second, to a plant with perianth differentiated into a calyx and a corolla. Since botanists apparently do not further subdivide the perianth, the TRI- construction, though orthographically impeccable, does not correspond to reality. In view of the fact that a number of the longest entries in Levine's list are obvious coinages (noisy lumberjack, unwatchdoglike, phantom figure, etc.), one must regretfully conclude that TRICHLAMYDEOUS is an invention.

I am much indebted to Charles Holding, Darryl Francis, Murray Pearce and Dmitri Borgmann for information on long well-mixed transposals already in the literature. The first of these kindly provided me with copies of several early Enigma articles on transposals.