

RESIDUAL HETEROGRAMS

SUSAN THORPE

Great Missenden, Buckinghamshire, England

A *heterogram* is a word with no repeated letters. *Residual heterograms* are made by discarding letter repeats in words and then rearranging the remaining letters to form a word. Words with repeated letters can be divided into

- those which do not have an equal number of each different letter
- those with an equal number of each different letter: pair isograms (two of each letter), trio isograms (three of each letter), etc.

Let us add the constraint that a word must have at least two different letters which are repeated.

The editor notes that residual heterograms are known as *letter banks* in the National Puzzlers' League. Puzzles based on this concept were introduced by Will Shortz at their 1980 annual convention.

Residual Heterograms of Words Which Are Not Pair or Trio Isograms

Eliminating an O and an I from OTHELLO makes THELO which rearranges into HOTEL. Readers might like to try starting with a phrase or name. Thus STAR TREK makes STREAK or SKATER and ROSS ECKLER makes LOCKERS. Here are more single-word examples. Most of the words can be found in the OED Second Edition. Subtracted repeats are shown in lower case.

Words with two different repeated letters

STAMMERS - ms = master, stream

GOOGOL - goo = log

TABULATE - at = betula (birch)

RUBBERS - br = rebus

SYLLABLES - lls = basely

ACROSTICS - cs = Caistor

MNEMONICS - mn = incomes

LINGUISTS - ls = lusting

AMSTERDAM - am = smarted

SENSELESS - eesss = lens

CASSELL - ls = scale, laces

ARGENTINA - an = granite

ALPHABETICAL - aal = pitchable

REVERSAL - er = salver

Words with three different repeated letters

RECREATIONAL - aer = clarinet

EPHEMEROPTERA - eeepr = metaphor

DODECAHEDRON - ddeo = anchored

TRANSDELETION - ent = sternoidal

GLENEAGLES - eegl = angels

TORPEDOERS - eor = sported

MISSISSIPPI - iiipsss =imps

SENTENCES - eens = scent

RECIPIENCE - cei = prince

DETROITER - ert = rioted, editor

Words with four different repeated letters

ASSEGAAIING - aaigs = easing
 GREAT BRITAIN - airt = berating

PERPETRATE - eeprt = taper
 ALLITERATION - ailt = oriental

Words with five different repeated letters

RENEGOTIATIONS - einot = orangiest
 INTERSECTIONS - einst = corniest

PARTICIPATOR - aiprt = apricot
 SECRETARIATS - aerst = raciest

Words with six different repeated letters

ANNIVERSARIES - aeinrs = ravines
 TRILITERALNESS - eilrst = entrails

SEMI-RETIREMENTS - eeeimrst = minster
 TRANSADDITIONS - adinst = intrados

Caistor is in Linconshire, and Gleneagles in Scotland; assegaiing is found in Chambers.

The letters of the residual heterogram may occur in the same order as in the original word:

UNDERGROUND - drnu = undergo
 TENNESSEE - eeens = tens
 SOONNESS - noss = ones
 INTENSEST - enst = inset

PARTICIPLE - ip = particle
 SIMILIES - iis = smile
 CROSSWORDS - orss = crowds
 BARBARA - aabr = bra

Best of all, the original word may give rise to an apposite word.

APPELLEE - eelp = plea

NEWSPAPER - ep = enwraps

Residual Heterograms of Words Which Are Pair or Trio Isograms

In spite of the not-inconsiderable space devoted to pair isograms in Word Ways, it appears that little attention has been paid to the two identical groups of letters which actually make the pair isograms (ABIL + ABIL for the pair isogram BILABIAL). Below is a selection of pair isograms with one of their two identical groups of letters discarded and the other made into a well-known heterogram. Heterograms whose letters appear in the same order as in the pair isogram are marked with an asterisk. Occasionally an entire heterogram appears as such in the pair isogram from which it is derived, such as SOME in MESOSOME, a word which could be said to be a twosome! I do not include these particular heterograms in the list below. The pair isograms listed below fall into two groups, those in which the letters in the first half of the word are repeated in the second half in a different order (REAPPEAR), and those in which this is not the case (APPEASES). Pair isograms which are also palindromes or tautonyms are not included. Only pair isograms with eight or more letters are considered.

Letters in first half repeated in second half

8 BILABIAL bail*
 ADINIDAN Dina*
 NOTITION into
 REAPPEAR pare, rape*
 SHAMMASH hams*

10 HORSESHOER shore
 INTESTINES inset
 SUPERPURES purse

14 TAENIODONTIDAE adonite, on a diet

SHIPPISH hips*
 SINGINGS gins*
 TEAMMATE meat, tame*
 TEISTIES site

16 ANTIPERSPIRANTES painters, pantries

Letters in first half not repeated in second half

8 APPEASES apes*

CONCISIONS coins*, icons
 MILLIEME Emil, lime*, mile*
 RATTAREE rate*, tear, tare*
 TITANIAN Tina*
 UNENDUED dune, nude
 VIVIENNE vein, veni, vine*

12 CANCELLANSES cleans, lances

CHARACTERETH hectar, Thrace
 CONOCUNEUSES ounces, Unesco
 GRADGRINDIAN daring
 INTERINSERTS nitre, trine*

10 ARRAIGNING grain

INSCIENCES since*
 MAAMSELLES males*, meals, Salem
 REPROPOSES pores, poser, prose*, ropes,*
 spore
 RETARDATED rated*, trade
 RIVERVILLE liver, viler
 TESSELLATA least, slate, tales
 TOOL-STEELS stole
 TROMOMETER metro

14 SCINTILLESCE clients, stencil

16 ESOPHAGOGRAPHERS hog-spear

For the record, charactereth (under 'character'), conocuneuses, maamselles, rereigning, teisties (under 'tystie') and tool-steels (under 'tool' n.) are in the OED Second Edition; concisions, gradgrindian, insciences and interinserts are in Webster's Second; cancellanses is in Webster's Third; tessellata is in Nomenclator Zoologicus; and Riverville is in the Times Index-Gazetteer of the World.

Finally, turning to the twelve-letter pair isogram TRANSNISTRIA (in the Columbia Lippincott Gazetteer of the World, 1964), lo and behold we discover that it takes two TRAINS to reach TRANSNISTRIA, a former Romanian administrative division organised in the occupied Ukraine during 1941 to 1943.