

# ABSOLUTE DIFFERENCE WORDS

REX GOOCH

Welwyn, Herts, England

## LONGEST WORDS

This article is a continuation of "Word Arithmetic" from the November Word Ways. Dmitri Borgmann in *Beyond Language* gave the four-letter absolute difference word FORM = 6 15 18 13 becomes 9 3 5 ICE. In "Difference Words" in the August 1971 Word Ways, Ross Eckler found in Webster's Collegiate 15 five-letter words such as SAFER and CHILD and three six-letter words from elsewhere: ELDEST, RETAIN, FRITOS. In "Difference Words Ride Again" in the August 1975 issue, Tom Pulliam added 10 more six-letter words from Webster's Unabridged, Second and Third editions.

I found the following number of source words, but many are obscure or imperfect (acronyms, especially for three-letter words):

Length	8	7	6	5	4	3
Number	2	20	157	1146	2957	2589

The following source and target words are all to be found in major dictionaries (OED, Web 2, Web 3, OSPD, Stedman's Medical Dictionary, Pulliam and Carruth *The Complete Word Game Dictionary*, American Heritage) or in past issues of Word Ways, or are proper names. A few which are of interest, but for which I have no respectable source, are indicated with a question mark. Acronyms are included at my discretion.

### Length 8

BEDRIGHT, CANIBAL

RUINATES, CLEMSON (University in South Carolina)

### Length 7 (selection)

STATOHM, ASSEGE  
HETHNES, COLFIN  
MYXOIDS, LAIFEO  
EXCERSE, SUBMAN.

TUBULES, ASSIGN  
FIXATES, COWSON  
SCHANSE, PEGMEN

ACUTATE, BRASSO  
MIDEWIN, DEARNE  
EXPANSA, SHOMER

RUTHENE, CALCII  
JANEIRO, IMIDIC  
XENATES, SIMSON

### Length 6 (selection)

POLYPS, ACMIC  
DAINTY, CHEFE  
WRITES, EIKON  
OUIJAS, FLAIR  
FRIGID, LIBBE  
BONBON, MALMA  
VIXENS, MOSIE  
SCONES, PLAIN(!)  
WAFTER, VENOM.

POINTY, AFEFE  
DAMNER, CLAIM  
WRENCH, EMIKE  
MUZLIN, HENCE  
FRITOS, LIKED  
REFRET, MALMO  
CROWED, OCHRA  
EUCLID, PRICE

EFTEST, ANONA  
SPALCH, COKIE  
KEFIRS, FACIA  
GOFAST, HIERA  
REDHOT, MADGE(!)  
BONANO, MAMMA  
TERSEL, OMANG  
CUPOLA, REACK

GIRDER, BINAM  
SPAWNS, COVIE  
FLIGHT, FINAL  
PETITE, KOKKO  
ANODES, MAKAN  
REJOIN, MEEFE  
SCHILD, PEACH  
EXPUGN, SHENG



Length 6 (selection of pairs, which give rise to a branching tree)

ADIGHT or KNIGHT give CEBAL  
MAPOLD/MAPOLT, LOACH

HAFTED/UNSETS, GENOA  
SCOPID/SCOPIN, PLAGE.

ELDEST/UNFEST, GHANA

Length 5 (selection)

TUNES, AGIN  
CAFES, BEAN  
DAINT, CHEF  
KOTAL, DESK  
PIXIE, GOOD(!)  
ALCOA certainly have furnaces, and maybe a KILN  
COTYN, LEEK  
RETEX, MOOS  
WEFTS, RANA  
BURSA, SCAR

DESEX, ANNS(!)  
CAMLE, BLAG  
SPANS, COME  
UPMET, ECHO  
MUFTY, HONE  
COXED, LISA(!)  
SCOTS, PLEA(!)  
SAFER, REAM  
ATIR, SKIM

MONKS, BACH  
RUVID, CAME  
MINOS, DEAD  
GAVIN, FUME  
MUFTI, HONK  
CONCH, LAKE  
VINOS, MEAD  
SABIN, RAGE  
CULOT, RICE  
TALCS, SKIP

MONEY, BAIT(!)  
HEFTY, CANE(!)  
KOJIC, DEAF  
UNWET, GIRO  
RITES, IKON(!)  
MAFIA, LECH  
ERMIN, MEDE  
ASTIR, RAKI  
BURSE, SCAN  
AXOID, WIFE(!).

Length 5 (selection from 108 pairs)

STONK/STOPS, AEAC  
KINIC/USNIC, BEEF  
OLDEN/TWONE, CHAI  
JOSEF (and NIEF) becomes EDNA!  
HONES/UNOFT, GAIN  
CONKS/THILD, LACH  
AOTES/KYTES, NEON  
SAPAN/WETER, ROOM

NOTES/POTES, AEON  
GINEP/YWRIT, BEIK  
SOJER/SOTIL, DEEM  
ELDIN/HAINS, GHEE  
CONES/THIRD, LAIN  
CREFT/TERSE, OMAN  
EXITS/TAPED, SOKA

NOCHE/POCHE, ALEC  
GINZO/MOTHS, BELK  
KOFTA/SOFTA, DINS  
IDIOT/NINTY, EEFE  
BIRDS/HOFTE, GINO  
CONEY/COPYE, LAIT  
SCONE/SCOPY, PLAI  
EXITE/TAPET, SOKO.

STAID/STAIN, ASHE  
KNIFE/SPURS. CECA  
CHILD/TONKS, EACH  
AGLOW/OINKS, FECH  
DOLMA/TILMA, KCAL  
BONES/VIJAO, MAIN  
SCRIE/SCRIM, POID

Length 5 (selection from 14 triplets)

ACHIM/KINOS/MOTSO, BEAD  
LINIE/LOTOS/ROTOS, CEED  
CHAIN(!)/INGOT/JELDI, EGHE  
ANONA/REDER/REFER, MAAM.

CAPUT/SETON/GETON, BOEA  
ADMIN?/FIRNS/KNEAF, CIDE  
JODIE/NITOS/TYNIE, EKED

BEDOT/LONCH/RUTIN, CAKE  
DIMLY/DIMNA?/NIEFS, EDAM  
DONER/SHIRE/ZONER, KAIM

Length 5 (selection from 4 quadruplets)

DELTS?/FELDE/FELTS/ONGON, AGHA  
DOPED/EPODE/PEDON/SHITS, KAKA.

CAJOU/GENIC/GENIO/PRINT, BIEF

Length 5 (quintuplets)

HILDE/HILTS/JILTS/NOLDE/PORZY all make ACHA, a word I have seen but sadly cannot source.

Note that some of the multiples (eg quadruplets) not presented would qualify as lesser multiples: eg KOTOS and MINIM both make DEED, hence a valid pair, even if MINIE and SOTOS could not be sourced convincingly. Thus, in an exhaustive sourcing exercise, some of the unquoted multiples may be downgraded, increasing the count of lower multiples, and decreasing the count of higher multiples.

Length 4: There is a huge number of words of this length, but very many use acronyms. The following examples use common words, and are sometimes apt

ONLY, ABM  
TUNA, AGM  
SUPT, BED  
PRIM/TRIM, BID  
KNOB, CAM  
SOFA, DIE  
CHEZ, ECU  
HOPI, GAG  
GONG/WONG, HAG  
TING, KEG

NORM, ACE  
POCO, ALL  
GINS/KINS, BEE  
KIRK/TRIP, BIG  
HEFT, CAN  
YULE, DIG  
CHAP, EGO  
PINA, GEM  
JAMB, ILK  
GRIM, KID

HIED/OPTS/POST, ADA  
MONG, BAG  
ECHO/KING, BEG  
GIRD, BIN  
ADEW/URSA, CAR  
EIRE/MIRE, DIM  
INCH, EKE  
HAFT, GEN  
FOAL, INK  
JULY/TIRE, KIM

TUNS, AGE  
CAFE/GINO/KINO/SUZY, BEA  
GIRT, BIB  
CAST, BRA  
BETH/SPAM, COL  
PLUG/SOFT, DIN  
DIVA, EMU  
BIRD/SLUG, GIN  
SIRE, JIM  
DODO/JUJU, KKK!

COPT, LAD  
BONA/OBAN/REFS, MAM  
WHIT, OAK  
WEFT, RAN  
AVOW, UGH

FRCS (= Fellow of the Royal College of Surgeons), LOP!  
CRIT, OIK  
CULS, RIG  
VASE, URN.

IVAN, MUM  
YING, PEG  
ATOP, SEA

WIRE, NIM  
BRIN, PIE  
TALC, SKI



## TREES

In "Difference Words" in August 1971, Eckler found the trees SLUG (or BIRD) - GIN - BE and GRIM - KID - BE. By extending these with the letter C, we may call these trees with a depth equal to the word length of four. Pulliam essentially extended this to five with SOFIA - DICH - EFE - AA and LOFTY - CINE - FEI - AD - C. (note that the first cannot continue to a single letter). In Making the Alphabet Dance, Eckler gave another example of depth five: BOXTY - MIDE - DEA - AD - (A). Here is a selection of the 203 such trees that I found, with emphasis on a common three-letter word or acronym. They are arranged in order of the two-letter words; some adjacent examples will be seen to belong to the same tree. Thus, BEA fans out twice to GIDE and GINO, and GINO in turn fans out twice. A few cannot end in a single letter.

Trees of depth 5 (selected, omitting final letter)

MONKS - BACH - ABE - AC  
MENIE - HIED - ADA - CC  
BIRDS - GINO - BEA - CD  
UNSEL - GENG - BIG - GB  
TONKS - EACH - DBE - BC  
FELDE - AGHA - FAG - EF  
WOPNE - HABI - GAG - FF  
EGYPT - BRID - PIE - GD

AGLOW - FECH - ABE - AC  
SOTHS - DELK - AGA - FF  
HOFTE - GINO - BEA - CD  
JINKS - AECH - DBE - BC  
ONSEN - AENI - DIE - ED  
FELTS - AGHA - FAG - EF  
FURZY - OCHA - LEG - GB  
DEYDE - ATUA - SAT - RS

OINKS - FECH - ABE - AC  
PIRNS - GIDE - BEA - CD  
BIDRY - GENG - BIG - GB  
CHILD - EACH - DBE - BC  
EXION - SOFA - DIE - ED  
ONGON - AGHA - FAG - EF  
BONDS - MAJO - LIE - CD  
FEYDE - ATUA - SAT - RS.

It might rightly be assumed that there are very many trees of depth four. I found 2093, though as with most numbers quoted in this article, the count is highly dependent on the acceptability of mainly two-letter and three-letter words. Because of the volume, we will comment only on the fact that branching is very common at this level. I found one fanout of 11, three of 10, and eight of 9 branching out from a three-letter word. Here they are:

BD, ACG, ABEL/DEHA/HILE/KLIP/NORK/NORY/POLE/POLS/PORK/PORY/TURK  
BD, ECG, CHEL/GLIB/JEHO/JOLE/NILE/NILS/PURY/TOLE/TORK/TORY  
BE, ECH, CHEM?/GLIA/GLOW/INKS/JOLT/NILD/TOLD/TOLT/WROG/WROW  
DD, AEA, HIDE/HINO/NOTS/NOTU?/ONST/POTS/POTU/STON/STOP/STYX  
AD, BCG, GILE/GILS/KILE/MOLE/MOLS/MORK/MORY/SURY/TRUN  
BB, ACA, ABED/BADE/IHED/KLOP/NORS/POLK/PORS/SRUV/TURS  
CD, BEA, CAFE/EGBA?/GIDE/GINO/KIDE/KINO/MOTS/MOTU/SUZY  
DA, GCD, ELIE?/HOLH/HOLP/HORN/IPSO (facto)/NURN/SLIE/SLIM/UNKO  
FB, CIG, BENG/BENU?/FIRK/FIRY/HENG/LIRK/RULE/SPYR/TWNG  
GB, BIG, ACLE/GENG/GENU/GIRK/KIRK/SULE/TRIB?/TRIP/WULE  
GE, BID, GENJ/GIRN/KIRN/PRIE/PRIM/SULP/TRIE/TRIM/WYPT  
JJ, AKA, BALK/BALM/HITS/NODE/ONYX/OPED/PODE/STIH/TSHI

Here are trees of depth four, again omitting the single-letter root, chosen for the familiarity of the three-letter and at least one four-letter "word" (and keeping other branches).



AA, ABC, ABDA/NMOL/POMP/STRO/STRU  
 AL, BAM, ECBO?/MONA  
 BD, KIM, JULY/PENA?/TIRE  
 BE, KID, GRIE/GRIM/NYPT  
 BH, EGO, CHAP/GLET/NIPA  
 BI, GEN, HAFT  
 CA, ADC, DEAD/DEIF/DEIL/FEAD/FEIF/FEIL/HIMP/JIMP  
 CA, LOP, FRCS (surgeons lop!)  
 CC, ADA, BAED/BCGF?/DEIH/HIED/NOST/OPTS/POST/TUYX  
 CD, URN, VASE  
 CL, DAM, KONA/SONA  
 DE, MID, ERIE  
 DI, MIR, ANEW  
 ED, DIM, EIRE/MIRE  
 EE, DID, EIRN/MIRV(abbr?)  
 FB, AGE, TUNS  
 FB, ICE, CLIN/CLOT/FORM  
 FF, AGM, BAHU/GHAN?/TUNA  
 FH, CIA, BENO/FIRS/IFON/KNED/LOFE/ROFE/ROXY  
 GD, LEA, COTS  
 GE, BIN, GIRD  
 HE, AIN, HIRD/JIRD/ONES  
 JJ, HRH, MUCK  
 KL, LAM, CONA/WKLY(abbr.)  
 LC, COL, BETH/HETH/SPAM  
 LI, COX, SPAY!!  
 MN, BOA, CAPO/CETU?/GETS/GIXY  
 NA, UGH, AVOW  
 NJ, OAK, APOD/WHIT  
 QM, RAN, WEFT  
 RR, SAS, TABU (Special Air Services is intended to be secret)

AD, JIM, SIRE  
 BB, ACE, FEHM?/NORM/TURM  
 BE, GIN, BIRD/SLUG  
 BH, ACK, HILA/KLOD/NOLA/POLA (name)  
 BH, GEM, BINA/PINA/UNIV  
 BM, CAN, ADES/BEFT/HEFT/ORSE/URSE  
 CA, ILK, JAMB/LUIT?  
 CB, BEG, ACHA?/ECHO/EGLE/GING/KING  
 CD, BEA, CAFE/EGBA?/GIDE/GINO/KIDE/KINO/MOTS/MOTU/SUZY  
 CG, FIB, FLUS  
 DE, KGB, ALEC/ITMO/SHOQ/YNGE  
 DH, OKS, APEX  
 ED, DIE, AENI/PLUP/SOFA  
 ED, NIM, GULY/SENA/WIRE  
 EE, DIN, EIRD/KOFT/MIRD/PLUG/SOFT  
 FB, CIG, BENG/BENU?/FIRK/FIRY/HENG/LIRK/RULE/SPYR/TWNG  
 FB, KEG, TING  
 FF, EKE, INCH/NITO  
 GB, BIG, ACLE/GENG/GENU/GIRK/KIRK/SULE/TRIB?/TRIP/WULE  
 GE, BID, GENJ/GIRN/KIRN/PRIE/PRIM/SULP/TRIE/TRIM/WYPT  
 HD, AIM, FENA?/HIRE/ONER/TULY  
 JJ, AKA, BALK/BALM/HITS/NODE/ONYX/OPED/PODE/STIH/TSHI  
 KC, LAD, CONJ?/COPT/THIE  
 KM, CNA, BEST/HEST/ROAB/RUGH/URDE  
 LC, COR, SPAS  
 LL, MAM, BONA/NABO/OBAN/REFS  
 MO, CPA (qualified accountant), RUED  
 ND, SEA, ATON/ATOP/TAFE  
 PQ, BRA, CAST(!) QB, VEG, AWRY  
 RR, ASA, ABUT/BATS/BATU/STAB/TUBA (American Standards for tubas?)

Our trees are rarely very tall, but sometimes bush out alarmingly! Nevertheless, little simulacrums of trees with branches at multiple levels do exist: ABE comes from both BACH and FECH; though BACH comes only from MONKS, FECH comes from both AGLOW and OINKS (of course, Bach has nothing to do with oinks!).

## PALINDROMES

A palindromic source word with an even number of letters cannot have a target since the central two letters must be the same. There therefore cannot be a normal tree of palindromes, though branching exists (see especially MAAM):

ABABA, AAAA; STOTS?, AEEA; DEKED, AFFA; DELED, AGGA; DEWED, ARRA;  
 STATS, ASSA; MINIM, DEED; SOTOS?, DEED; OTATO, ESSE; MAPAM, LOOL;  
 ANONA, MAAM; REDER, MAAM; REFER, MAAM; ANANA, MMMM; HUHUUH,  
 MMMM; SEDES, NAAN; SAPAS, ROOR