SYMMETRIES OF THE ALPHABET

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The letters of the alphabet exhibit five varieties of symmetry (or non-symmetry):

A M T U V W Y have left-right (vertical) symmetry (.272) v
B C D E K have up-down (horizontal) symmetry (.218) h
N S Z have 180° (rotational) symmetry (.137) r
H I O X have all three symmetries (.205) a
F G J L P Q R have no symmetry (.168) n

In running text, the various symmetries appear with the indicated probabilities; for example, left-right symmetry occurs twice as often as rotational symmetry,

These appear to be all the possible theoretical symmetries. In particular, it is impossible to create a “letter” with two but not three symmetries, i.e., with left-right and rotational (but not up-down), with up-down and rotational (but not left-right), or with left-right and up-down (but not rotational) symmetry.

Can one locate a set of 120 five-letter heterograms which contain one letter with each kind of symmetry, arranged in all possible symmetry orders? Using only words in boldface from Webster’s Second or Third (plus inferred forms such as past tenses and plurals), it appears to be impossible. One difficulty appears to be that vowels are contained in only 3 of the 5 symmetries. If one allows OED words or placenames, however, then a full collection is likely possible.

The collection below is restricted to Websterian words. Each possible ordering is identified by lower-case letters vhnr. Although only a couple of examples are typically shown, a few orders are especially fecund:

navhr GIVEn LiVEN riVEN GivEs LiVES FiVES riVES LiMES riMES riTES LOvES LOADs ROADS GOALs
hnavr CLoYS CLoTS BLOTS BLOWS BRoWS CROWs BLOWn BROWN CROWN CLOn BRiMS DROn
rvahnr SMiLE SMiRK SHORE SWORD STiLE SWiPE STOlE STOPE STOrE STOrK

ahnr
ahnrv HEFTS
ahnrv HENRY
ahnrv HEAPS HEALS
ahnrv
ahnrv OLENT
ahnrv OREAS
ahnrv
ahnr

anvr
anvr OFTEN
anvr
anvr INEPT INERT
anvhn INCUR
anvhn INLET
anvhn INRUB
anvhn INTER
anvhn INURE
avnh OWERS
avhn

avnr
avnr HARES
avnr
avrhn OWNER HAZEL
avrn HAZLE
hrnr CORNY
hrnr KORAN BOGUS
hrnr CONGA DINGY
hrnr DINAR
hrnr BOARS CHAPS
hrnr BHANG
Finally, a challenge to computer programmers: can the alphabet be partitioned into five groups so that all 120 permutations can in fact be found among Websterian heteronyms?