HETEROGRAMMIC WORD SQUARES

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A heterogrammic word square (one containing no repeated letters) is limited to size three or four; a size five square containing 25 different alphabetic letters is impossible to achieve. In *Making the Alphabet Dance* (St. Martin's, 1996), heterogrammic 4-squares by George Lopes, Jeremy Morse and Jeff Grant are given.

The Lopes square first appeared on p 61	CYST GOWF BASH -
of the July/August MIT Technology	OPAH UDAL RULY
Review. The Lopes and Grant squares	RIMU MIRE ITEM
consist of words in Webster's Second.	FLED PNYX GOWN

Recently, Wei-Hwa Huang of Mountainside California used a computer to look for all possible heterogrammic 4-squares based on the Webster's Second database compiled by the Air Force in the 1960s (this is not complete, omitting many obsolete or variant words such as YPIL and RULY). This corpus is reproduced below, arranged in clusters of squares which differ in only a single letter. Words which can be found in the Official Scrabble Players Dictionary contain one or more capital letters. Note that no square consists solely of OSPD words, although a number fail by only one word. (However, the Grant square contains eight OSPD words, and therefore is a candidate for the finest heterogrammic word square.)

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CLoG CLoP clow                                    tash tACH
raku raku raku                                    uGLY uGLY
IDeS IDeS IDes                                    riem riem
byth byth byth                                    dOWN dOWN

fLoc fLoG fLoP flow          cafh CAPH CASH BASH BACH
raku raku raku raku          UGLY UGLY UGLY UGLY UGLY
iDes iDeS iDeS ides          riem riem riem riem riem
byth byth byth byth          DOWN DOWN DOWN DOWN DOWN

flob fLoC fLoG fLoP flow     cafh CAPH CASH BASH BACH
raku raku raku raku raku     UGLY UGLY UGLY UGLY UGLY
iDeS iDeS iDeS iDeS ides     riem riem riem riem riem
mYtH mYtH mYtH mYtH myth     TOWN TOWN TOWN TOWN TOWN

GLoP GLow PLow BLow BLoc
raku raku raku raku raku
IDeS IDes IDes IDes IDes     saft baft BASt CASt
MYtH MYth MYth MYth MYth     UGLy UGLy UGLy UGLy
                             riem riem riem riem
                             dowp dowp dowp dowp
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tHUS tHUS tHUS        flUb glub glub GlUM        ScaB Scam scaw
yANK yANK yANK        roPy RoPy RoPy RoPY        PulI Puli Puli
mICE mICE mice        ikAt IkAt IkAt IkAT        OveR Over Over
pLOW pROW pROG        mesh MeSh nesh nesh        tynd tynd tynd

tHUS tHUS thUS              clUb
yANK yANK yANK              roPy
mide mide mide              ikAt
pLOW pROW pROG              nesh


SlAW SlOW    bosH bosK    SHOW sHOW SHOW    SLAP sLAP SLAP
TiVY TiVY    uncI uncI    TIVY tIVY TIVY    NODE nODE wode
AmEN AmEN    ryal ryal    uran uran uran    URIC uRIC URIC
BuRD BuRD    empt empt    beld gELD MELD    byth mYTH MYTH


wode woVe    bosH bosK    GLIb GLIB    gHAt gHAt    sLub sLUb
unIt unIt    uncI uncI    yuca yuca    lINy lINy    nAvy nARy
scRy scRy    ryal ryal    PROf PROW    odum ovum    oMit oMIt
paLm paLm    empt empt    SENt SEND    resp resp    pech pech


pAwL pAwL    snop snop    spad Spat    STaB STaG STaP
icho icho    wabe wabe    WylE Wyle    WYlE WYlE WYlE
smur smur    uvic URIC    UriC Uric    URiC URiC URiC
kend tEnD    MYTH MYTH    MonK Monk    MOnK MOnK MOnK


spor spor spor    atmo    blup    CapH    clow    dich
TiVY tiVY TiVY    whip    yore    ObeY    yigh    unze
uzan uzan uzan    fels    twin    FilM    SKuA    BLAw
beld geLD MeLD    uNDy    haCk    trun    TEmP    syrt


flEW     gish     josH     khir     LEwD     pLUs     RiSK
rupa     OnCE     uncI     lady     icho     rane     OnCE
icON     udal     ryal     open     frab     oDIc     udal
myst     tymp     empt     must     tuny     byth     tymp


SaKE     scyt     shab     shUt     SloW     SMuG     SpOt
TrIM     LAir     TOlU     pyro     PixY     pize     WiRy
UgLY     upgo     EMiR     alin     AmeN     ORaL     uzan
BoND     behn     WYnD     deCk     turd     tynd     MeLd
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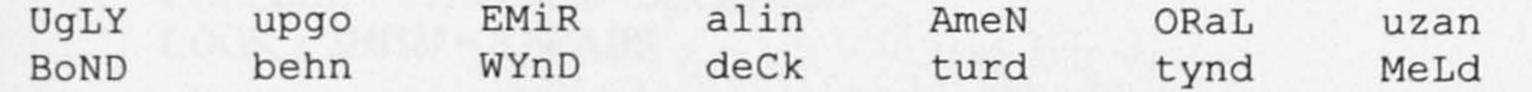
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tHIS       wESt       wICK
yANK       hYPo       unze
mure       uRIc       sLAT
pLOW       dANk       pyro
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It is somewhat easier to find a pair of 3-squares with no repeated letters. Eric Harshbarger programmed a computer to search for all such pairs using words from the fourth edition of the Official Scrabble Players Dictionary, finding a total of 26.

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ACE IFS    AGE IFS    AMU EFS    BAD IFS    BAP CIS    BAP EFS
WUD MOL    WUD MOL    WOG LIP    ECU MOL    UGH WRY    UGH NIL
NTH PRY    NTH PRY    NTH DRY    NTH PRY    DOT MEN    MOT DRY


CAB EFS    CAB EFS    CAP EFS    CAP EMS    CAP EFS    CAP EFS
WHO NUT    WHO NUT    UGH NIL    UGH NIL    UGH NIL    WHO NUT
MIG DRY    MIX DRY    BOT DRY    BOT DRY    MOT DRY    MIL DRY


CAP EFS    CAP FLU    CAP GOT    CEP GHI    CEP OBI    CIS DAP
WHO NUT    WHY RET    WHY UNS    WRY NOD    WRY FUN    WRY UGH
MIX DRY    MIX ODS    MIX LEK    MAX UTS    MAX TSK    MEN BOT


CRY PST    CRY PST    CRY PST    CRY PST    CRY PST    CRY PST
WHA UKE    WHA UKE    WHA UKE    WHA UKE    WHA UKE    WHA UKE
MOG BID    MOG BIN    MOG DIN    MOG LID    MOG LIN    MOG NIL


GAD IFS    WAD IFS
ECU MOL    ECU MOL
NTH PRY    NTH PRY
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Again, certain clusters are formed: CRY/WHA/MOG has six matching 3-squares, IFS/MOL/PRY has five matching 3-squares, EFS/NUT/DRY has four matching 3-squares, and EFS/NIL/DRY has three matching 3-squares. Words containing no vowels are found in all 26 pairs; CWM, the most common, is in 14, followed by PST and NTH in six, PHT in four and TSK in one. Oddly, there are no pairs with CWM in one square and NTH or PHT in the other. All can be found in the January 8 2006 entry of Eric Harshbarger's weblog Logolog (http://ericharshbarger.org/cgi-bin/logolog.cgi), inaugurated December 7 2005.