PALINDROMIC LETTER-SEQUENCES

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There are about 7800 different trigrams which occur in words listed in boldface in Webster's Second Edition, making it feasible to compile a dictionary of types. Approximately 80 per cent of these trigrams (those appearing in Webster's Collegiate) were published in the August 1969, November 1969 and November 1970 Word Ways; since that time, Philip Cohen of Aliquippa, Pennsylvania has discovered examples for most of the remaining Websterian trigrams, as well as others in Webster's Third. However, a type dictionary for tetragrams or longer letter-sequences is a far more laborious undertaking, requiring the assistance of a high-speed digital computer; for example, it is likely that more than half a million different seven-letter sequences exist. Consequently, one must focus attention on long letter-sequences having interesting properties.

In this article, we consider palindromic letter-sequences -- those that read the same either forward or backward, like huLLABALLoo -- of six or more letters in length. Specifically, we list (in alphabetical order) all such sequences that are known, and give up to three examples of Websterian boldface words containing each sequence. This work was materially aided by the existence of Jack Levine's out-of-print three-volume computer listing of 584,000 different Websterian words of two to sixteen letters in length grouped together by similar letter-patterns (for details, see Word Ways for February 1972, November 1972 and August 1973). Nevertheless, it was necessary to check many different patterns and it is quite likely that a few have been overlooked.

Actually, Levine lists not only words in boldface type from Webster's Second and Third Editions, but also inferred forms such as noun plurals and verb tenses (-ED, -S, -ING). Because of this, and because of the generous use of prefixes and suffixes, the same root words appear again and again; for example, we noted 42 different words based on INTERPRET. We list only one example for each root.

Following the nomenclature suggested by Dmitri Borgmann in Language on Vacation (Scribner's, 1965), three different types of words can be distinguished in these lists: palindromes, anchored palindromes (palindromic sequences at the beginning or end of a word), and interior palindromes (palindromic sequences inside a word). The first two types can contain two or more letters. Perhaps there are two or more nine-letter-sequences as well.

All letter-sequences such as huLLABALLoo, AILLI, AKAA, ANAA, ANIN, ARCO, BARR, BATT, BITTI, CANN, CARR, CILLI, COCC, COLL.

Can one tell from the abundance? If one tries ES, a word such as LIGHTFAITHES, a WOLF, a WALLAW.

PALINDROMES

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from Webster's such as ANAPANAPA and MISSISSIPPIS, contain two or more differently-centered palindromes of six or more letters. Perhaps the most remarkable word of this type is KINNIKINNIK, one of the many varied spellings for a mixture of dried leaves and bark from the sumac or dogwood, smoked by the Indians and early settlers of the Ohio valley. This eleven-letter full palindrome, the longest one in Webster, contains two symmetrically-placed six-letter palindromes as well. Certain words in the list are also reduplications (such as WALLAWALLA) or near-reduplications (such as LIBIDIBI).

Perhaps the most interesting property of these lists is the relative abundance of palindromic letter-sequences of odd and even lengths: there are more different seven-letter sequences than six-letter-ones, more nine-letter sequences than eight-letter ones, and more eleven-letter-sequences than ten-letter ones. Why this should occur is not clear, but it discouraged us from surveying five-letter sequences.

All letter-sequences appear in their words without interruptions such as hyphens or apostrophes. Words with asterisks are inferred forms which are not directly listed in Webster's, either in boldface or lightface; the reader must decide in each case whether or not the construction is admissible. For example, the dictionary lists the word SAKKA as a name for India in Hindu mythology; can this be pluralized to SAKKAS? Similarly, the dictionary lists ENGOLDEN (below the line); can this be reasonably expanded to ENGOLDENEDLY?

If one were to admit other dictionaries these lists would enlarge. For example, in Language on Vacation Dmitri Borgmann notes the extraordinary eleven-letter anchored palindrome in POSSESSERESS, a word derived from a seventeenth-century term for female possessors, found in the Oxford English Dictionary.

A number of words, such as ANAPANAPA and MISSISSIPPIS, contain two or more differently-centered palindromes of six or more letters. Perhaps the most remarkable word of this type is KINNIKINNIK, one of the many varied spellings for a mixture of dried leaves and bark from the sumac or dogwood, smoked by the Indians and early settlers of the Ohio valley. This eleven-letter full palindrome, the longest one in Webster, contains two symmetrically-placed six-letter palindromes as well. Certain words in the list are also reduplications (such as WALLAWALLA) or near-reduplications (such as LIBIDIBI).

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| AILLIA     | gailliarde  | DAFFAD  | daffadowndilly |
| AKAKA      | akaakai     | DEGGED  | decked         |
| ANAANA     | Canaanese   | DELLED  | corelled       |
| ANINA      | Lecaniae    | DENNED  | denned         |
| AROORA     | tambaroora  | DESSED  | desed*         |
| BARRAB     | barricable  | DIFFID  | diffident      |
| BATTAB     | batactable  | DILLID  | Armadillidium  |
| BITTIB     | Abittibi    | DIPPID  | Cydippida      |
| CANNAC     | Cannaceae   | DISSID  | dissident      |
| CARRAC     | carrack     | GALLAG  | gallage        |
| CILLIC     | bacillicide | GAMMAG  | gymnagragic    |
| COCCOC     | coccochromatic | HALLAH  | chailah       |
| COLLLOC    | collocate   | HANNAH  | Hannah         |
| CONNOC     | Connochaetes|         |                |
HATTAH Chattahoochee form. RENNER renner
IBAAIBI kibaabing* RESSER presser
KAKKAK kakkak RATTER tibbit
KASSAK kassak REDDER tillite
KEFFEK keffekil REDDER gravitation
KILLIK killikinick REGGER tinstitus
KINNIK kinnikinick REGGER tirrit
LDOODL swelledoodle ROWWOR arrowworm
LISSIL gliselle ROWWOR thowwart
LOSSLGL glossology ROWWOR sparrowwort
LOTTLGL glottologist MARRAM SAKKAS Sakkas*
MARRAM marram MARRAM sarras*
MATTAM mattamore MARRAM marram
MILLIM millimeter MILLIM selles
MILLIM millimeter MILLIM selles
MITTIM mittimus MITTIM selles
MURRUM Murrumbidgee pine MURRUM sarras*
NACCAN menaccanite NACCAN sarras*
NALLAN anallantoic NALLAN sarras*
NANNAN nannander NANNAN sarras*
NAPPAN knappan NAPPAN sarras*
NARRAN unarranged NARRAN sarras*
NECCEN unecentric NECCEN sarras*
NEMMEN synemmenon NEMMEN sarras*
NENNE unessential NENNE sarras*
NETTEN brunetteness NETTEN sarras*
NIBBIN snibbing NIBBIN sarras*
NIPFIN sniffing NIPFIN sarras*
NIGGIN snigging NIGGIN sarras*
NILLIN vanillia NILLIN sarras*
NIMMIN nimming NIMMIN sarras*
NIPPIN nipping NIPPIN sarras*
NIPPIN nipping NIPPIN sarras*
NISSIN warnissing* NISSIN sarras*
NITTIN knitting NITTIN sarras*
PINNIP pinniped PINNIP sarras*
RAGGAR braggart RAGGAR sarras*
RAMMAR grammar RAMMAR sarras*
RAPPER rapparee RAPPER sarras*
RASSAR brassard RASSAR sarras*
RATTAR rattaree RATTAR sarras*
REDDER redder REDDER sarras*
REGGER gregger REGGER sarras*
REKKER trekker REKKER sarras*
RELLER timbrellet RELLER sarras*
RELLER quarreler RELLER sarras*

ACIFIC
ACIVIO
ADINII
AKAMAI
AKAPAI
AKARA
ALAGA
ALAPA
ALAYA
APANA
APPOC
ARABA
ARACA
ARAJIA
ASSES
ATAM.
ATINT
AVADA
AYAKA
AYALAI
AWAKA
BLAJAI
CALCI
CINNI
DIEFIP
DERBF
DEVOV
ECIPIO
EDICID
EDIVIL
EERTF
ELAEF
ELAEF
EMEAD
EMITT
ENDEI
ENDID
ENJOIN
ENOLC
EREPE
EROMIC
ETALAI
ETINT
EVISIV
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ACIFICA  pacification  glacification  opacification
ACIVICA  extracricificaly  GNIZING  recognizing  sovereignizing*  stagnizing
ADINIDA  Adindia
AKAMAKA  takamaka
AKAPAKA  opakapaka
AKARAKA  Makaraka
ALAGALA  galagala  palapalai
ALCICLA  calciyclase
ANABANA  guanabana
ANAPANA  anapanapa
AMARAMA  ramarama
ANAYANA  upanayana
APANAPA  anapanapa
APOCOPA  apocopate
ARABARA  barabara  caracara
ARACARA  caracara  carajara
ASSESSA  assessable
ATAMATA  matamata  Latinitaster
ATINITA  AVADAVA  avadavat
AVAKAVA  kavakawa
AWAKAVA  kawakawa  biajalba  calciaclite
CALCLAC  riclinic acid  deified
CINNIC  ricinic acid  deified
DEIFIED  BEEBRED  underbred
DEVODED  devoved precipice
ECIPICE  weedicide
EDIVIDE  redivide
EERTREE  steertree
ELAEALE  Thymelaeales
ELEVELE  relevled*  EMADAME  bemadamed*
EMITIME  semtime
ENDEDNE  intendedness  distendedness  extendedness  splendidness
ENDIDNE  splendidness
ENIOINE  Tainioinei
ENOLONE  pregnenolone
ERERERE  reference
EROMORE  Theromores
ETALATE  metalate
ETINITE  retinite  previsive
GNITING  igniting
GNIZING  recognizing  sovereignty*
HADEDA  hadedah ibis
HAHIGAH  hahigah
IBIDIBI  libidibi
ICOSOC  ethicosocial
IDOIDI  coccioldian
IKITIKI  tikitiki
KIWIWI  awikiwiwi
LLILLI  wiliwili
INAMANI  chinamaniac
INAYANI  Himayanist
INOONI  germinogonies*
IRACARI  Phthiracaridae
IRIBIRI  biribirii
IRIIIRI  piripirii
IRRIPIRI  piripiri  isorosindone
ISSISSI  Mississippie
ITITITI  nitidities
ITIVITI  sensitivities  primitivities  hereditivities*
ITOMOTI  excitomotion
IWIWII  kivikivi
IWIWII  kivikiwi
IZINIZI  phlorhizinizing
KUKUKUK  kukukuku
LDENEDL  engoldedness*
LDEREDL  bewilderedly  solderedly*
LLABALL  hullaballo  whillaballo
LLEWELL  Llewellyn  skilligillee
LLIGILL  mesoseme  sesame
LLOCOLO  mononomial  murdurmum
MURDRUM  mononomial  murdurmum
NAURUAN  Nauruan
NECOGEN  gyneocentric
NITATIN  sanitating  unlevelness
OLEOLE  locofoco
OLCOMOCO  mocomoco
OITATIO  exploitation  deploitation
OMOEOMO  homoeomorph
We are much indebted to Dmitri A. Borgmann for pointing out several palindromic letter-sequences not listed in Levine.
COMMENT (Dmitri A. Borgmann): To my knowledge, the preceding article is the first comprehensive presentation of the subject of interior palindromes ever published. For this reason, the authors should have been more liberal in deciding what classes of words to include. In particular, they have ignored hyphenated words and two-word terms, as well as dictionaries and reference works other than Webster's Unabridged. Furthermore, there are numerous words which, although not appearing in dictionaries themselves, are closely related to words which do. Examples of all these types of interior palindromes of 8 letters or more are presented below. Derivative terms are indicated by means of an asterisk. All terms not in Webster's Second or Third are suitably explained in parentheses following them.

29: GAMMA GAMMA GAMMA GAMMA GAMMA GAMMA (a fictional college sorority on p. 93 of the September 1965 Esquire)
20: HOOHOO; HOO, HOO, HOO, HOO-HOO (The Oxford English Dictionary: the cry of the brown owl, as given in a 1906 quotation under tu-whoo)
13: GOLDENROD-ADORNED* (analogous to stucco-adorned)
12: ESPAGNOLETTE-LONG* (analogous to span-long and winter-long)
11: ANANAS ANANAS (Webster's First: the scientific name for the pineapple)
BOONOO BOONOO (Times Index-Gazetteer of the World: a town in New South Wales, Australia)
CECOMOCOCOMOCO (Hamil Kenny's The Origin and Meaning of the Indian Place Names of Maryland: a former Indian village)
COOLOO COOLOO (P. G. Cassidy and R. B. Le Page's Dictionary of Jamaican English)
COONOO-COONOO (Dictionary of Jamaican English)
GOONOO GOONOO (Times Index-Gazetteer of the World: a town in New South Wales, Australia)
HELULE HELULE (Peter and Annie Fowler's The Log of British Hits 1955 to 1969, forming part of "Rock File", edited by Charlie Gillett: title of a song by the Tremeloes)
LEVITATIVELY* (the adverb corresponding to levitative)
MORE MONOMEROUS (comparative form of monomeronous)
NEVER-PREVENTING* (analogous to never-quenching)
POSSESSESSES (The Oxford English Dictionary: an old spelling of possessresses)
TOO-HOO! TOO-HOO! (The Oxford English Dictionary: the cry of the owl, as given in an 1899 quotation under tu-whoo)
WALLA WALLA, WA. (the post office form of a Washington city)
YATATA YATATA (Wentworth and Flexner's Dictionary of American Slang: idle chatter)
10: BRAZIL LIZARD* (analogous to Canada lynx)
DECIMILLIMICRON* (one-tenth of a millimicron)
LARGESSE-GRANTING* (analogous to prize-giving)
ZION, ILLINOIS (Webster's New Geographical Dictionary: the full name of a city in Illinois)

BANNALANNA (Funk & Wagnalls Unabridged: an Irish barmaid)
DELLA VALLE (Webster's Biographical Dictionary: Pietro della Valle, Italian traveller, 1586-1652)
KAPPA KAPPA GAMMA (1963 World Almanac: a social college fraternity)

LESS ASSELFING (inverted comparative form of the participial adjective asseling)
LESS ESSELENIAN (inverted comparative form of the adjective Esselenian)
MASSINISSA (Webster's Biographical Dictionary: Numidian king, 238-149 B.C.)
MORE AEROMARINE (comparative form of aeromarine)
MORE MONOMERIC (comparative form of monomeric)
MORE PEROMELOUS (comparative form of peromelous)
MORE SEROMUCOUS (comparative form of seromucous)
PATTAWATTAMES (Frederick Webb Hodge's Handbook of American Indians North of Mexico: a variant of Potawatomii)
PLATE METAL
RIKKI-TIKKI-TAVI
TIRED-EYEDER (comparative form of the adjective tired-eyed)
WAGGA WAGGA (Webster's New Geographical Dictionary: a town in Australia)

8: APOLLO PATROUS (listed under Apollo in Webster's Second)
AWARD-DRAWING* (analogous to money-earning)
DRESSER DOWN* (one who delivers a dressing down)
EVER-REVERED* (analogous to ever-beloved)
MEDAL-LADEN* (analogous to peril-laden)
MOOD-Doomed* (analogous to hell-doomed)
MORE ERROMANTIC* (comparative form of the adjective eromantic, that variant spelling of aeromantic corresponding to eromancy as a dictionary variant of aeromancy)
OVERREVOLT* (analogous to overreact)
POTOOOOOOO (Encyclopedia Britannica, 13th Edition: the name of an eighteen-century British race horse)
PREDISSIDENT* (analogous to preconsenting)
RAT-TAT-TATTED
RESUFFUSE* (analogous to respread)
SELF-FLESHING* (analogous to self-enriching)
SNEILLLEN'S TEST (Dorland's Illustrated Medical Dictionary: a test for pretended blindness in one eye)
VESSELLESS* (analogous to shipless)
WOOROOROOKA (Times Index-Gazetteer of the World: a town in Queensland, Australia)