PA L I N D R O M I C  L E T T E R - S E Q U E N C E S

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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 Webserian 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 huLLABALoo -- 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 Webserian 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. Per-
types can be used as centerpieces of palindromic sentences, but the third cannot.

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 KINNINNIK, 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? Can one talk about MISSISSIPPIS when there is only one state or river?

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.

<table>
<thead>
<tr>
<th>AILLIA</th>
<th>gailliardc</th>
<th>DAFFAD</th>
<th>daffadowndilly</th>
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<tr>
<td>AKAAKA</td>
<td>akaakai</td>
<td>DEGGED</td>
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<td>ANANA</td>
<td>Canaanean</td>
<td>DELLED</td>
<td>cordelled</td>
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<td>ANINA</td>
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<td>AROORA</td>
<td>tambaroora</td>
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<td>DILLID</td>
<td>Armadillardium</td>
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<td>Cannaceae</td>
<td>DIPPID</td>
<td>Cydippida</td>
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<td>carrack</td>
<td>DISSID</td>
<td>dissident</td>
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<td>CILLIC</td>
<td>bacillicide</td>
<td>GALLAG</td>
<td>gallage</td>
</tr>
<tr>
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<td>cocochromatic</td>
<td>GAMMAG</td>
<td>gammagraphic</td>
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<tr>
<td>COLLOC</td>
<td>collocate</td>
<td>HALLAH</td>
<td>challah</td>
</tr>
<tr>
<td>CONNOC</td>
<td>Connochaetes</td>
<td>HANNAH</td>
<td>Hannah</td>
</tr>
</tbody>
</table>

In words listed in the August issue that time, examples for others in Webster's or longer requiring the use of the asterisk, it is likely that occurrences exist. Palindromes have been used as centerpieces of palindromic sentences, but the third cannot.

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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: HOOHOHO HOHOO HOHOO HOHOO-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 monomeros)

NEVER-PREVENTING* (analogous to never-quenching)

POSSESSORESSES (The Oxford English Dictionary: an old spelling of possessesses)

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-GRAINTING* (analogous to prize-giving)
ZION, ILLINOIS (Webster's New Geographical Dictionary: the full name of a city in Illinois)

9: 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 participle 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 JEROMIAN (comparative form of Jeromian)
MORE MEROMORPHIC (comparative form of meromorphic)
MORE MONOMERIC (comparative form of monomeric)
MORE PEROMELOUS (comparative form of peromelous)
MORE SEROMUCOUS (comparative form of seromucous)
MORE XEROMORPHAL (comparative form of xeromorphal)
PATTAWATTAMEES (Frederick Webb Hodge's Handbook of American Indians North of Mexico: a variant of Potawatomi)
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-DOMED* (analogous to hell-doomed)
MORE EROMANTIC* (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)
SNELLLEN'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)