

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 huLLABALLo -- 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 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 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? 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-ES, a word derived from a seventeenth-century term for female possessors, found in the Oxford English Dictionary.

ALLIA	gailliarde	DAFFAD	daffadowndilly
	bailliage	DEGGED	degged
AKAACA	akaakai	DELLED	cordelled
ANAANA	Canaanaean		modelled
ANINA	Lecaninae		yodelled
AROORA	tambaroora	DENNED	denned
BARRAB	barrable	DESSED	dessed*
BATTAB	battable	DIFFID	diffident
BITTIB	Abittibi	DILLID	Armadillidium
CANNAC	Cannaceae	DIPPID	Cydippida
CARRAC	carrack	DISSID	dissident
CILLIC	bacillicide	GALLAG	gallage
COCCOC	cocochromatic		gallaglass
COLLOC	collocate	GAMMAG	gammagraphic
	collochore	HALLAH	challah
CONNOC	Connochaetes	HANNAH	Hannah

HATTAH	Chattahoochee form.	RENNER	renner
IBAABI	kibaabing*	RESSER	presser
KAKKAK	kakkak		addresser
KASSAK	kassak		oppresser
KEFFEK	keffekil	RETTOR	retter
KILLIK	killikinick		fretter
KINNIK	kinnikinick		regretter
LDOODL	swelldoodle	ROBBOR	corrobboree
LISSIL	glissile	ROWWOR	arrowworm
LOSSOL	glossology		throwwort
LOTTOL	glottologist		sparrowwort
MARRAM	marram	SAKKAS	Sakkas*
MATTAM	mattamore	SAMMAS	Smmas*
MILLIM	millimeter	SANNAS	hosannas
	simillimum	SARRAS	sarras*
MITTIM	mittimus	SDEEDS	misdeeds*
MURRUM	Murrumbidgee pine	SEGGES	segges*
NACCAN	menaccanite	SELLES	mademoiselles
NALLAN	anallantoic		Moselles
NANNAN	nannander		selles
NAPPAN	knappan	SENNES	Senneser
NARRAN	unarranged	SESSES	assesses
	narrante	SETTES	rosettes
NECCEN	uneccentric		marquissettes
NEMMEN	synemmenon		croisettes*
NESSEN	unessential	SIPPIS	Mississippis*
NETTEN	brunetteness	SOTTOS	risottos
NIBBIN	snibbing	STAATS	staatsraad
NIFFIN	sniffing	SUCCUS	succus
	Kniffin system	SUFFUS	suffuse
NIGGIN	snigging	SURRUS	susurrus
NILLIN	vanillin	TACCAT	staccato
	coronillin	TAFFAT	taffata
NIMMIN	nimming	TALLAT	tallat
NIPPIN	nipping	TANNAT	stannate
	snipping		tannate
NISSIN	warnissing*	TARRAT	tarratine
NITTIN	knitting	TEBBET	tebbet
PINNIP	pinniped	TELLET	mantelletta
RAGGAR	braggart		castellet
RAMMAR	grammar		Stelletta
RAPPAR	rapparee	TERRET	terret
	overappareled		sterrettite
RASSAR	brassard		interreticular
RATTAR	rattaree	TIBBIT	tibbit
REDDER	redder	TILLIT	tillite
	shredder		gratillity
REGGER	gregger	TINNIT	tinnitus
REKKER	trekker	TIRRI	tirrit
	voortrekker	UARRAU	Guarrau
RELLER	timbreller	WALLAW	Wallawalla
	quarreller	WILLIW	williwaw

ACIFICA	pacification glacification opacification	GNITING	igniting
ACIVICA	extracivically	GNIZING	recognizing sovereignizing* stagnizing
ADINIDA	Adinida	HADEDAH	hadedah ibis
AKAMAKA	takamaka	HAGIGAH	hagigah
AKAPAKA	opakapaka	IBIDIBI	libidibi
AKARAKA	Makaraka	ICOSOCI	ethicosocial
ALAGALA	galagala	IDIOIDI	coccidioidian
ALAPALA	palapalai	IKITIKI	tikitiki
ALCICLA	calciclase	IKIWIKI	awikiwiki
ANABANA	guanabana	ILIWILI	wiliwili
ANAPANA	anapanapa	INAMANI	chinamaniac
AMARAMA	ramarama	INAYANI	Hinayanist
ANAYANA	upanayana	INOGONI	germinogones*
APANAPA	anapanapa	IRACARI	Phthiracaridae
APOCOPA	apocopate	IRIBIRI	biribiri
ARABARA	barabara	IRIJIRI	pirijiri
ARACARA	caracara	IRIPIRI	piripiri
ARAJARA	carajara	ISOROSI	isorosindone
ASSESSA	assessable	ISSISSI	Mississippi
ATAMATA	matamata	ITIDITI	nitidities
ATINITA	Latinitaster	ITILITI	vitilitigate
AVADAVA	avadavat	ITIVITI	sensitivities primitivities hereditivities*
AVAKAVA	kavakava	ITOMOTI	excitomotion
AVALAVA	lavalava	IVIKIVI	kivikivi
AWAKAWA	kawakawa	IWIKIWI	kiwikiwi
BIAJAIB	biajaiba	IZINIZI	phlorhizinizing
CALCLAC	calclacite	KUKUKUK	kukukuku
CININIC	ricininic acid	LDENEDL	engoldenedly*
DEIFIED	deified	LDEREDL	bewilderedly solderedly*
DERBRED	underbred	LLABALL	hullaballoo whillaballoo
DEVOVED	dèvoved	LLEWELL	Llewellyn
ECIPICE	precipice	LLIGILL	skilligillee
EDICIDE	weedicide	MESOSEM	mesoseme
EDIVIDE	redivide	MONONOM	monomial
EERTREE	steertree	MURDRUM	murdrum
ELAEALE	Thymelaeales	NAURUAN	Nauruan
ELEVELE	releveled*	NECOCEN	gynecocentric
EMADAME	bemadamed*	NITATIN	sanitating
EMITIME	semitime	NLEVELN	unlevelness
ENDEDNE	intendedness distendedness extendedness	OCOFOCO	locofoco
ENDIDNE	splendidness	OCOMOCO	mocomoco
ENIOINE	Taenioinei	OITATIO	exploitation deplotation
ENOLONE	pregnenolone	OLOCOLO	colocolo
EREFERE	rereference	OLOKOLO	kolokoloko
EROMORE	Theromores	OMOEOMO	homoeomorph
ETALATE	metalate		
ETINITE	retinite		
EVISIVE	previsive		

OMONOMO	homonomous	SEMEMES	sememes
OMOSOMO	chromosomology	SEMIMES	semimessianic
OMTITMO	Tomtitmouse	SENONES	Senones
ONAMANO	bonamano	SENTNES	absentness presentness
ONOGONO	monogonoporic	SEPIPES	hawsepipes* horsepipes* hosepipes*
ONOTONO	monotonous	SERERES	misereres
OOTSTOO	footstool	SERORES	seroresistance
OROCORO	corocoro	SERTRES	desertress
OROPORO	poroporo	SINONIS	Sinonism
OROTORO	torotoro	SOOLOOS	sooloos
OSSESSO	possessor	SREFERS	misrefers*
OTAWATO	Potawatomi	TARTRAT	tartrate
OTTETTO	mottetto	TERFRET	interfret
PEEWEEP	peewEEP	TERPRET	interpret
PERPREP	superpreparation	TERURET	interureteric
PRETERP	preterpluperfect preterpolitical	TRAPART	intraparty tetrapartite
PROCORP	procorporation	TROCORT	electrocortin
PROMORP	promorphology	TROHORT	electrohorticulture
PROPORP	coproporphyrin	UKUKUKU	kukukuku
PSOROSP	psorosperm	UKUNUKU	humuhumunukunukuapuaa
REITIER	freitier*	UKUTUKU	tukutuku
REPAPER	repaper	UMUHUMU	humuhumunukunukuapuaa
REVIVER	reviver	UPUKUPU	okupukupu (see fern)
ROMEMOR	promemorial	URUKURU	Kurukuru
ROTATOR	rotator	URUMURU	murumuru oil
ROTUTOR	protutor	URUPURU	Purupuru
ROWNWOR	brownwort crownwork crownwort	VITATIV	gravitative vitativeness
RREFERR	counterreferring*	YSPEPSY	dyspepsy
SAWBWAS	Sawbwas*	YTICITY	analyticity
SCOLOCS	scolocs*		
SEITIES	ipseities		
SELFLES	selfless		

CAILLIAC cailliach

STELLETS castellets

ALLAWALLA	Wallawalla	MALAYALAM	Malayalam
ERREFERRE	counterreferred	REDIVIDER	predivider
EVITATIVE	levitative	SSERTRESS	assertress
INNIKINNI	kinnikinnic		

KINNIKINNIK kinnikinnik

SENSUOUSNES sensuousness

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 monomeric)
 NEVER-PREVENTING* (analogous to never-quenching)
 POSSESSERESSES (The Oxford English Dictionary: an old spelling of possessoresse)
 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)
- 9: BANNALANNA (Funk & Wagnalls Unabridged: an Irish barmaid)
 CHOCCOLOCCO (Rand McNally New Cosmopolitan World Atlas: a town in Alabama)
 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 asselfing)
 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)
 PATAWATTAMEES (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-DOOMED* (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)
 POTOOOOOOOO (Encyclopedia Britannica, 13th Edition: the name of an eighteenth-century British race horse)
 PREDISSIDENT* (analogous to preconsenting)
 RAT-TAT-TATTED
 RESUFFUSE* (analogous to respread)
 SELF-FLESHING* (analogous to self-enriching)
 SNELLEN'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)