

# WORD LADDERS OF TODAY

LEONARD J. GORDON  
Redlands, California

In an earlier article, I showed how many of the classic word ladders proposed by Lewis Carroll could be shortened with the aid of the computer. In this article, I use the computer to construct many new word ladders having various characteristics.

## Minimum-length Word Ladders

Minimum-length, or ideal, word ladders change N letters in only N steps. Many minimum-length ladders can be constructed out of 4-letter words. With 5-letter words, one can find a ladder between almost any word-pair; some are minimum-length, but usually more than 5 steps are needed. With 6-letter words, a ladder between a pair of words chosen at random is usually impossible, but there are plenty of good pairs to be found. The computer can find minimum-length ladders between 6-letter words, but it is often difficult to find ones with meaningful relationships between the end words.

FOOT-fort-ford-fard-YARD	YARD-yare-mare-male-MILE	FOOT-moot-molt-mole-MILE
FOOL-mool-moll-mull-MULE	MULE-mure-mere-here-HERD	HEAD-heed-hoed-koes-TOES
HOGS-hags-lags-lars-LARD	BLUE-blae-brae-bray-GRAY	BLUE-glue-gee-gley-GREY
HERE-hern-tern-teen-THEN	COLD-hold-held-head-HEAT	BEER-peer-pees-pies-PISS
HAIR-hail-bail-ball-BALD	HARD-hart-hast-east-EASY	SWAN-swag-snap-sang-SONG

TIGER-timer-tamer-tames-lames-LAMBS	SHEEP-sheet-sleet-slept-slipt-CLIPT
LAMBS-lames-lanes-banes-bones-BONED	MUSTY-mussy-mossy-mousy-mouse-HOUSE
BONNY-boney-bones-tones-tines-TIMES	MACHO-machs-macks-packs-pucks-PUNKS
FUNNY-bunny-bunns-bunds-binds-BIRDS	BILLY-bills-bolls-bolts-boats-GOATS
BOOKS-gooks-goods-goats-grads-GRADE	FUNKY-funks-dunks-dunes-dynes-DYKES
KINKY-linky-liny-liner-liver-LOVER	HELLO-hells-wells-welds-wolds-WORDS

MISSUS-misses-masses-massed-masted-wasted-WANTED  
 CURIOS-curies-carries-cartes-carted-wanted-WANTED  
 WHACKY-whacks-shacks-stacks-stalks-stales-STYLE  
 BRAZEN-brazes-crazes-crozes-crores-chores-CHORUS  
 PASTAS-pastes-paster-poster-potter-pother-MOTHER  
 CODGER-conger-conner-tonner-tonnes-tennes-TENNIS  
 BLOODY-bloods-broods-broads-breads-dreads-DREAMS  
 BLONDE-blonds-blinds-blinks-clinks-clicks-CHICKS  
 ROCKET-rocker-hocker-honker-hanker-hanger-HANGAR  
 SNORTS-shorts-shirts-shists-whists-whisks-WHISKY  
 CHARAS-chares-chores-chokes-choked-cooked-HOOKED  
 STONED-stored-stores-stares-shares-chares-CHARAS

In the fourth 6-letter example, chorus could be replaced with the more apt whores, but the ladder is no longer ideal.

## Joining Transposals By Word Ladders

In the following, the end words are transposals of each other; in all but the last, every letter must be changed. Note that several of the end words are reversals of each other. I have not seen any other examples of these kinds of ladders.

RAJA-raga-rags-rigs-rims-aims-aims-alas-alar-AJAR

CHEAT-cleat-bleat-blest-blast-beast-least-leash-leach-TEACH

ESTER-eater-tater-tates-atares-tarns-terns-terne-TERSE

LARGE-marge-merge-verge-venge-venae-venal-renal-REGAL

TRIPS-tripe-trine-thine-shine-spine-spire-SPIRT

STOUT-shout-shott-shots-soots-toots-TOUTS

PORTS-pouts-pours-sours-spurs-spurt-SPORT

KNAPS-snaps-swaps-swans-spans-SPANK

REPINS-rewins-rewing-sewing-sering-serins-series-serves-selves-solves-soaves-staves  
-stapes-stipes-snipes-SNIPER

RECAPS-remaps-remans-remand-remend-reseed-rested-tested-teated-seated-seared  
-spared-spaced-SPACER

REPAID-repand-remand-remend-resent-reseed-rested-rester-raster-rasper-rapper-dapper  
-draper-DIAPER

## Assorted Word Ladders

Here are a few ODDS and ENDS, including a selection of 7-letter word ladders. A few of these were suggested by the books mentioned in the previous article. **Purple-yellow** is a good sequel to **black-white**. I like **bandit-gallows** because it takes 13 steps. I do not know of any 7-letter ladders besides those given here. I did not try to find 8-letter ones.

ODDS-adds-and-ENDS

WOOL-wood-word-worn-warn-YARN

TOWN-tows-tots-pots-pits-pity-CITY

BEAU-bead-lead-load-lord-lore-LOVE

PAPER-taper-taped-TYPED

CARDS-carls-calls-cells-dells-deals-DEALT

GAMBA-gambs-games-gales-galls-calls-cells-CELLO

BREAD-break-bleak-bleat-blest-blast-boast-TOAST

CARVE-carse-corse-horse-house-rouse-roust-ROAST

CHEEK-check-chick-chink-chins-coins-coils-cowls-JOWLS

SKIRT-skint-skins-sains-wains-waits-wants-PANTS

WHALE-while-whine-chine-chins-coins-conns-cones-BONES

TOXIC-toric-boric-baric-basic-basis-basts-baste-WASTE

LAGER-layer-sayer-shyer-shoer-shoes-shots-shoot-shout-STOUT

PUSSY-pursy-purse-puree-purer-puler-paler-taler-tiler-TIGER

GUTSY-gutty-cutty-cutty-cuter-citer-titer-timer-timed-TIMID

SEVEN-semen-semes-sexes-sixes-sines-sinhs-sighs-sight-EIGHT

DRUNK-drank-brank-brans-brats-boats-borts-bores-sores-sorer-SOBER

BANJO-banco-bunco-bunko-bunks-punks-pinks-pinas-pimas-simas-simar-SITAR

THREE-threw-shrew-shred-sired-tired-tires-tiles-tilts-silts-silty-SIXTY

ANGEL-anger-agger-egger-eager-eater-dater-dates-dames-demes-demos-DEMON

BLIND-blink-clink-clonk-clons-cions-lions-lirms-links-sinks-sinhs-sighs-SIGHT

DISHES-dished-dashed-WASHED

FALLEN-faller-feller-heller-healer-heaver-leaver-LEAVES  
 ROOKIE-bookie-bootie-bootee-booted-hooted-hoofed-COOFED  
 GUNMEN-gunnen-gunner-runner-ruiner-ruined-rained-railed-JAILED  
 PAUPER-pauser-pauses-passes-pisses-wisses-wishes-wiches-RICHES  
 BROKEN-broker-booker-boozer-bonzer-bonder-bender-mender-MENDED  
 GRAVID-graved-craved-craver-crater-coater-cotter-potter-pother-MOTHER  
 WINTER-winner-wirier-airier-aerier-aeries-series-serins-sering-SPRING  
 PAPERS-capers-copers-cooers-cooees-cooeed-cooled-coaled-goaled-GRADED  
 TARTAN-tartar-tarter-barter-batter-better-beater-beaver-braver-brazer-BLAZER  
 YUPPIE-yippie-yippee-yipped-lipped-lisped-wisped-wished-wishes-wiches-RICHES  
 TARZAN-tartan-tartar-tarter-barter-barker-burker-burger-burgle-bungle-JUNGLE  
 SPRING-sering-serins-series-serves-selves-helves-helved-helmed-hemmed-hemmer-hummer  
 -SUMMER  
 VALISE-valine-maline-marine-murine-purine-purins-burins-buries-buried-burked-barked  
 -parked-PACKED  
 PURPLE-purply-purely-surely-sorely-sorels-morels-motels-hotels-betels-bevels-levels  
 -levees-levies-bevies-belies-belles-belled-balled  
 -ballet-ballot-ballon-billon-billow-bellow-YELLOW  
 DROPPED-cropped-clopped-clapped-clasped-classed-CLASSES  
 CRITTUR-critter-fritter-flitter-flutter-fluster-flusher-FLUSHED  
 DOOLIES-doilies-dailies-bailies-bailees-bailers-baiters-gaiters-gainers-garners-garnets  
 -gurnets-GURNEYS  
 CHEATER-cheated-chested-crested-crusted-crushed-crashed-crashes-brashes-braches-beaches  
 -teaches-TEACHER  
 BANDITS-bandies-pandies-panties-parties-parries-perries-ferries-ferlies-fellies-felloes  
 -fellows-fallows-CALLOW  
 PICKING-pecking-perking-jerking-jerkins-jerkies-jerkier-perkier-peakier-beakier-brakier  
 -brasier-brasher-brashes-braches-beaches-PEACHES  
 WOUNDED-bounded-bounder-blunder-blunter-bluster-blaster-plaster-platter-platier-peatier  
 -peakier-perkier-jerkier-jerkies-jerries-ferries  
 -ferlies-fellies-dellies-dollies-doolies-DOOLEES  
 TRIOLET-triplet-tripled-tripped-tripper-gripper-griper-grazier-brazier-brakier  
 -beakier-peakier-peatier-pettier-nettier-nettler-nettles-settles-settees  
 -setters-petters-putters-punters-punners-runners-runnels-ronnels-RONDELS

All of the above are the shortest ladders (least links in Carroll's nomenclature) between the end words. When the computer found alternate paths of the same length, I usually chose links that had some association with the end words: cheek-chins-jowls is an example. For a final sample, chaos-order is a great word association, but the shortest ladder uses some uncommon words. Here it is, followed by longer ones using more familiar words.

CHAOS-chats-coats-colts-coles-codes-coder-cider-aider-adder-odder-ORDER  
 CHAOS-chats-coats-boats-bolts-boles-bodes-bides-aides-aider-alder-older-ORDER  
 CHAOS-chaps-chops-coops-corps-cores-codes-coder-cider-eider-elder-older-ORDER  
 CHAOS-chats-chits-whits-waits-warts-wares-wades-wader-wider-eider-elder-older-ORDER

## A Sequence Of Word Ladders

Lewis Carroll converted **wheat** to **bread**, and **flour** to **bread**. This suggested to me the problem of converting **wheat** to **flour** to **dough** to **bread**, a much more difficult problem, since **dough** and **toast** have a different vowel-consonant pattern than the three words Car-

roll considered. Here are two solutions to the problem; I suspect that improvements are possible.

WHEAT-cheat-cleat-bleat-bloat-float-flout-FLOUR-floor-flood-blood-blond-blend-bleed-blued-glued-glues-gluts-gouts-routs-route-rouge-rough-DOUGH-cough-couch-pouch-poach-peach-peace-place-plane-plans-plays-prays-preys-treys-trees-treed-breed-BREAD-tread-triad-tried-tries-trims-trams-teams-beams-beaus-beaut-beast-boast-TOAST

WHEAT-cheat-cleat-bleat-bloat-float-flout-FLOUR-flout-float-bloat-bleat-blest-blast-boast-roast-roust-rouse-rouge-rough-DOUGH-bough-brugh-brush-brash-brass-braes-brees-breed-BREAD-tread-treed-trees-tress-ress-crass-class-clast-coast-TOAST

## Stepwords

In this section, we require that every other link be a transpositional. There are four variations, depending on how we define which type of link to use at each end; I illustrate the choices for isle-inch. If one exhibits transposals horizontally and letter-changes vertically, the reason behind the term stepword is evident. Unfortunately, too few words allow transposal for us to find many interesting ladders with transposals at both ends.

inch	inch-chin	inch	inch-chin
itch-chit	coin-cion	itch-chit	chis-ichs
chis-ichs	lion-lino	shit-hist	ices-sice
ices-sice	line-lien	list-lits	side-dies
side-dies	lied-idle	lies-isle	lies-isle
diel-idle	isle		
isle			

Here are some Carroll word ladders in stepword form.

grass	seven-neves	white-withe	shore-shoer
trass-tsars	never-nerve	lithe-thile	shier-hires
tears-stear	serve-sever	toile-teloi	vires-rives
shear-share	siver-viers	telos-toles	river
shore-heros	tiers-tries	tales-stale	
heron-honer	trigs-girts	stalk-talks	
goner-genro	girth-right	calks-slack	
genre-green	eight	black	

And here are a few of my own inventions.

chili	actor-taroc	stale-steal	cheat
chile-chiel	taros-ratos	stead-dates	cheap-peach
shiel-heils	rates-stare	dater-tread	teach
heals-hales	stage	bread	
work	hates-haste		
wort-trow	caste-cesta	golf	soup
trop-port	costa-tacos	wolf-fowl	scup-cups
part-rapt		foal-loaf	tups-puts
work	rape-reap	leaf-feal	nuts
cork-rock	leap-pale	balm-lamb	meal-male
rack-cark	paly-play	lane-male	mage-game
care-race		mage-game	
rate-tear			
teal-late			