

# THE PURPLE TURTLE

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The PURPLE TURTLE is a magical beast. With one glance, it turns an ABBEY into an ALLEY, reduces a BULB to PULP, makes a VESSEL into a VASSAL, and converts a MUMMY to a PUPPY. By turning POMP into a BOMB, MONACO becomes a MENACE. And from TAMPA to TEMPE, it turns KODAK into SODAS. It's enough to give an ENGINE ANGINA.

But there are some things the Purple Turtle cannot do. It can't make a CONNECTION to a COLLECTION, and turning a NEEDLE into a NOODLE is quite beyond it. No matter what it does, SISTER does not TITTER. And though the PURPLING TURLING is BURBLING, it's not GURGLING.

As you've probably deduced from the above, a Purple Turtle happens when one letter is substituted for all (two or more) of another letter in a word to make another word. But the substitution has to be commutative. That is, the change has to be able to be reversed. This would not be an issue if it weren't for the requirement that all instances of a letter be substituted for.

Due to the availability of on-line word lists, finding Purple Turtles turned out to be an easy task. For this project I combined the web2 and web2a lists that have been around for years with an extension of the Official Scrabble Words list called enable.txt (downloaded from the National Puzzlers' League site). To this I added a list of US place names extracted from the GNIS database. In the discussion and lists below, place names will be followed by the abbreviation of the state or territory in parenthesis.

I then wrote a program that found all sets of Purple Turtles within the file. A set is all those that are the same except at the substitution points: i.e., BURBLE / GURGLE / PURPLE / TURTLE is a set. My program found more than 5000 sets of Purple Turtles. (If anyone wishes a copy of the file, they can send me email and I'll send it back.)

As you might expect, the bulk of the Purple Turtles found were substitutions of doubled letters such as NEEDLING / NOODLING and CANNOT / CARROT. I felt that these were the least interesting of all the Purple Turtles. Indeed, there seemed to be a direct relationship between the distance of the substitution points and how interesting the Purple Turtle is. The most interesting were those with substitutions at or near opposite ends of the word, such as POULP / SOULS and CERVICES / NERVINES.

Three-letter substitutions are less common than two-letter ones but are not especially rare. However, all but these eight involved doubled letters: ALALA / ULULU, ARABA / URUBU, ARACA / URUCU, ARACARI / URUCURI, CALCIFIC / SALSIFIS, CARAPA / COROPO, TAMBALA / TOMBOLO, and TARATA / TERETE. For the others, it's rare for there to be more than two letters intervening between the doubled letter and the third. PENNYSTONE / PERRY STORE (AL) is the single exception in my file.

There's a handful of four-letter substitutions: BEEBEE / BOOBOO, KAKKAK / TAT-TAT / WAW-WAW, KAVAKAVA / KIVIKIVI, PIRIPIRI / POROPORO / PURUPURU, and PRIBBLE-PRABBLE / PRITTLE-PRATTLE. There are no five-letter substitutions, but there is a single six-letter set: BIBBLE-BABBLE / DIDDLE-DADDLE / TITTLE-TATTLE.

Among the longest solidly written Purple Turtles are several word-length records I'd like to note. Longest overall COLLECTIVENESS / CORRECTIVENESS, MEDDLESOMENESS / METTLESOMENESS, and SLUGGISHNESSES / SLUTTISHNESSES (14 letters); longest with no doubled letters BARBARIZATION / MARMARIZATION (13 letters); longest with three substitutions MAMMIFEROUS / PAPPIFEROUS (11 letters); longest in a set of three or more words DINGLEDANGLE / JINGLEJANGLE / TINGLETANGLE (12 letters).

Another significant record is the largest set of Purple Turtles (14 elements): BABA / CACA / DADA / GAGA / HAHA / KAKA / MAMA / NANA / PAPA / SASA / TA-TA / WAWA / YAYA / ZAZA (ID). There's also a set that substitutes all the vowels: TA-TA / TETE / TITI / TOTO / TUTU / TY TY (GA).

With such a large number of Purple Turtles, it seemed appropriate to see if all 375 possible substitutions were represented. It turned out that 277 were.

AB auras / burbs	AC aleak / cleck
AD Aira / dird	AE anticar / enticer
AF Aiae (HI) / fife	AG aurae/gurge
AH taiga / thigh	AI quacksalver / quicksilver
AK sauna / skunk	AM toatoa / tom-tom
AN aevis / Nevin (CA, KY)	AO abelian / obelion
AP area / prep	AR Aotea / roter
AU zamboorak / zumbooruk	AW Aoa (AS) / wow
AY coala / coyly	
BC borable / coracle	BD babble / daddle
BF bulbil / fulfil	BG barbet / garget
BH baba / haha	BI habnab / Hainai
BJ bay-bay / Jay Jay (FL)	BK banaba / Kanaka
BL backband / lackland	BM barb / marm
BN bobwhite / nonwhite	BO bleb / oleo
BP barbal / parpal	BR beback / rerack
BS blurb / slurs	BT barbaric / tartaric
BV barbe / varve	BW brab / wraw
BX berobed / Xeroxed	BY baba / yaya
BZ bibb / zizz	
CD cancer / dander	CE toc-toc / toetoe
CF cicer / fifer	CG crance / grange
CH caca / haha	CI Concan (TX) / Ionian
CJ coco / Jo Jo (PA)	CK choca / khoka
CL cacopathy / lalopathy	CM codec / modem
CN comical / nominal	CO chic / Ohio
CP crochet / prophet	CR conduce / rondure
CS calcify / salsify	CT decence / détente
CV calces / valves	CW caca / wawa

CY caca / yaya

DF died / fief

DH dum dum / humhum

DJ dingedangle / jinglejangle

DL dowdy / lowly

DN dogged / noggen

DR dashed / rasher

DT dread / treat

DW dada / wawa

DZ danda / zanza

EG tineine / tinging

EI dearest / diarist

EM toetoe / tom-tom

EP tyee / typp

ES equate / squats

EU enflesh / unflush

FG faffle / gaggle

FI boff / Boii

FK fife / kike

FM furfur / murmur

FO pfft / poot

FR fief / rier

FT fife / tite

FW Afifi / awiwi

GH geegaw / heehaw

GJ gagman / jajman

GL gadger / ladler

GN agog / anon

GP gurgle / purple

GS gouge / souse

GV Galga / valva

GY dogleg / doyley

HI phpht / pipit

HL horah / loral

HN Hohe / none

HP heh / pep

HT hashed / tasted

HV hah / vav

HY haha / yaya

IK Ioni / konk

IO biting / botong

IS buriti / bursts

IU sibilate / subulate

IZ tie-tie / tzetze

CZ coocoo / zoozoo

DG danda / ganga

DI odd / oii

DK deled / kelek

DM daytide / Maytime

DP daddies / pappies

DS coedited / coesites

DV dad / vav

DY dawned / yawney

EH ease / hash

EK seine / skink

EO mesquite / mosquito

ER bee / brr

ET suberise / subtrist

EY monogene / monogyny

FH foo-foo / Hoohoo (WV)

FJ haff / hajj

FL faff / fall

FN fifth / ninth

FP furfuraceous / purpuraceous

FS faff / sass

FV ferfet / vervet

FY Mafafa (AS) / Mayaya (GU)

GI wagwag / Waiwai

GK gong / konk

GM gorgon / Mormon

GO gleg / oleo

GR gugal / rural

GT disgorged / distorted

GW Gheg / whew

GZ gange / zanze

HK hech / keck

HM heathen / meatmen

HO sh-sh / soso

HS heath / seats

HU sh-sh / susu

HW haha / wawa

HZ Hoohoo (WV) / zoozoo

IL Boii / boll

IR heii / Herr (IN)

IT Irani / trant

IY timpani / tympany

JK jejuna / kekuna  
 JM juju / mumu  
 JR ajaja / arara  
 JT jinja / tinta  
 JZ juju / Zu-zu

KL kavakava / lavalava  
 KN kaik / nain  
 KR kopek / roper  
 KT skylike / stylite  
 KW kaka / wawa  
 KZ bekko / bezzo

LM lanolin / manomin  
 LP lolled / popped  
 LS longfelt / songfest  
 LV sally / savvy  
 LY Lolo / Yo-yo

MN mummeries / nunneries  
 MR madam / radar  
 MT manism / tanist  
 MW momser / wowser  
 MY mama / yaya

NP unwarn / upwarp  
 NS encrown / escrows  
 NU bonbon / boubou  
 NW nagnag / wagwag  
 NZ innards / izzards

OR maomao / Marmar  
 OU porporate / purpurate  
 OZ toetoe / tzetze

PR pupal / rural  
 PT porpoise / tortoise  
 PW papa / wawa  
 PZ pipit / zizit

RS rider / sides  
 RU armors / aumous  
 RZ burred / buzzed

ST shingles / thinglet  
 SW shes / whew  
 SZ tsetse / tzetze

TV tarted / varved  
 TY patent / payeny

JL juju / lulu  
 JN ajaja / anana  
 JS juju / susu  
 JY Jo Jo (PA) / Yo-yo

KM kiaki / Miami  
 KP keeker / peeper  
 KS kalpak / salpas  
 KV kike / vive  
 KY kaka / yaya

LN foldless / fondness  
 LR colonel / coroner  
 LT libel / Tibet  
 LW palpal / pawpaw  
 LZ Lilith / zizith

MP mammiferous / pappiferous  
 MS malm / sals  
 MV mimer / viver  
 MX Merom (IN) / Xerox  
 MZ bumming / buzzing

NR ovenstone / overstore  
 NT banana / batata  
 NV nan / vav  
 NY Mandan / mayday

OS ochavo / schavs  
 OY topo / typy

PS pinup / sinus  
 PV palpiform / valviform  
 PY papa / yaya

RT roquer / toquet  
 RY herder / heydey

SV salse / valve  
 SY lasers / layery

TW tillot / willow  
 TZ Tantalian / Zanzalian

UV euouae / evovae

UY tutu / Ty Ty (GA)

VW vaivode / waiwode

VY vav / yay

VZ divvy / dizzy

WY wawa / yaya

WZ wigwag / zigzag

A few interesting ones not in the above lists: AGNATE / IGNITE, ASTHMA / ISTHMI, BOOTHBAY (ME) / SOOTHSAY, DOWNSIDE / TOWNSITE, ELOPE / SLOPS, FREIHEIT (TX) / FRESHEST, LEGLESS / REGRESS, LINE COULEE (MT) / PINE COUPEE (LA), PIKE LAKE (WI) / PINE LANE (NJ).

And finally, perhaps the most interesting and certainly my favorite: BAD DEBT / SADDEST.

### How Others See Us

*In Volume 31(3) of the Journal of Recreational Mathematics, editor Charles Ashbacher writes about Word Ways:*

Words are too important to be used only as a means of transmitting information; they should also be used to entertain and amuse. That's the philosophy behind the publication of this journal and the contributors are successful in their efforts. Some of the best puns that I have ever read appear in this journal. Other common topics include geometric patterns made with words, patterns of letters in words, and dual meanings of words. It is a tribute to the richness of language that so many patterns arise in the words that we use. The authors also actively examine other languages in their searches for interesting linguistic material.

Wordplay also has an advantage over other areas, in that the database is non-static. Words are constantly being added to the language, and with the advantage of the modern archiving of information, words no longer leave our language at the rate that they used to. It is also possible for a practitioner to create a new word to describe a circumstance that had not been succinctly been named before.

Wordplay is fun, but it also demonstrates many important characteristics of humans. We are imaginative, creative, and can find interesting information everywhere. This journal demonstrates all of these features and I recommend it to everyone.