

## GENERALIZED ALTERNADES: PART 1

REX GOOCH

Letchworth, Herts, England

This article reports on work done on alternades and their generalisations. It presents new longer alternades, trinades, etc., and reports for the first time (as far as I can see) words which have these properties up to three ways--*polyalternades* or *multiple alternades*. I have also found words whose extracted words are themselves alternades (*multilevel alternades*).

My starting point should probably be Dmitri Borgmann's *Language on Vacation*, in which he defined an *alternade* as a word in which the odd-numbered letters, in order, made a word, and the even-numbered letters made another word. His longest example, one of the best in terms of familiarity of words, was the 11-letter TRIENNIALLY which yields TINILY and RENAL. He defined *trinades* similarly, taking every third letter to make three words. The most familiar word among his longest 12-letter examples was PACIFICATORY, splitting into PICO, AFAR and CITY. He also mentioned *quadades* or *quaternades* such as PANTALOONERY, composed of PAN, ALE, NOR and TOY, and *quinades* such as PARASITOLOGICAL, which becomes PIG, ATI, ROC, ALA and SOL. Finally he mentioned a *reverse trinade* such as ASTRONOMICAL which contains LINT, AMOS and CORA. In passing, note that in *Word Ways* the term *lends* applies to a word extracted from another in just such a fashion as above, but leaving a rump that is not a word. The term seems to have come from ALTERNADES itself, which treated as an alternade produces ATRAE (the female plural of "black" in Latin) and LENDS. The November 1993 *Word Ways* gives other examples of lends such as POETESS in PROTECTRESSES. In 1976 Tom Pulliam discovered LARGEHEARTEDNESS (not to imply he was excessively mean before then!) which yields LERN, AHTE, REES, and GADS.

I define the scope of this investigation as follows. I start with the first letter of a long word, and choose a *stride length*. I count out this number of letters successively along the long word until I am past the end, and this gives the first short word. I do the same starting with the second letter of the long word to get the second word, and so on, never using any letter twice. In addition, the long word is usually no longer than 20 letters, and the short words extracted from a single long word are all the same length to within one letter, every short word having at least four letters. (Actually, the reader will observe that I break my four-letter rule in order to find words with triple properties, which then led to the need to treat 3s more generally.) Thus, a stride length of one merely reproduces the original word, a stride length of two produces alternades, etc. These conditions mean that the successive words extracted never increase in length, and their lengths never differ by more than one: for example, a 16-letter word will be

broken into words of length 6,5,5, never 6,5,6 or 5,6,6, and certainly not 1 and 15! Thus there are plenty of other extractions which I do not investigate. (The National Puzzlers' League calls arbitrary extractions such as 2,4,3,4 or 5,2,6 *interlocks*.)

The process may be described in reverse: take a number of words differing in length by no more than one, and use them in decreasing order of length, choosing in turn the leftmost unused letter from each. With  $n$  words, this is an  $n$ -way merge. In fact, this is a useful constructive method of finding the long words, since under certain conditions we need only consider words that reverse into other words (including palindromes). These conditions are noted in the Doubles (Same Length) and Triples sections of the article.

### Quantitative Results

The following tables summarise the findings. They are to be read as follows: the first column describes the split of the long word into its components, and the second column gives the number of words in which the components are read in the same direction, the number of words in which the components are read in the reverse direction, and the (much smaller) number of words for which components in both directions can be found. Thus, for 14-letter words splitting 5+4+4, I found 110 with forward-reading components and 42 with reverse-reading ones, but only one that could be read both ways (PALACE-COVERED to PACED, ACOR, LEVE and to DECAP, EVEL, ROCA).

4+4	3576, 2442, 413	4+3+3	10364, 7315, 1947
5+4	1141, 786, 86	4+4+3	2303, 1503, 227
5+5	167, 140, 4	4+4+4	560, 349, 29
6+5	14, 10, 1	5+4+4	110, 42, 1
6+6	1, 1, 0	5+5+4	16, 4, 0
		5+5+5	2, 1, 1
4+4+4+4	28, 25, 1		
5+4+4+4	10, 1, 0	4+4+4+4+4	1, 0, 0
3+3+3+3	13138, 12812, 3956		
3+3+3+3+3	3013, 3072, 640		
3+3+3+3+3+3	575, 545, 74		
3+3+3+3+3+3+3	94, 98, 11		
3+3+3+3+3+3+3+3	17, 19, 1		

Some words of 12 letters can be split in more than one way; these are tabulated below.

4+4+4, 3+3+3+3	51
4+4+4, 3+3+3+3(rev)	57
4+4+4(rev), 3+3+3+3	38
4+4+4(rev), 3+3+3+3(rev)	28
4+4+4, 4+4+4(rev), 3+3+3+3	4
4+4+4, 4+4+4(rev), 3+3+3+3(rev)	2
4+4+4, 3+3+3+3, 3+3+3+3(rev)	15
4+4+4(rev), 3+3+3+3, 3+3+3+3(rev)	7

Amazingly, there is one 15-letter word that can be split in two ways: PARASITOGENESES to PATES, ASONE, RIGES (vf) as well as to PIN, ATE, ROS, AGE, SES (vf).

## Expectations

It's always interesting to ask how many examples one might expect to find. In the case of one 5-letter word and one 4-letter word, I found 1141 examples, but would expect only 29 if the 9 letters had been chosen at random. Similarly, when extracting four 3-letter words from a 12-letter word, I found 13138 when only 586 might have been expected, and found 14 (0.1 expected) when extracting 6-letter and 5-letter words from 11-letter words. There is therefore some property of these words which strongly biases alternate letters to form words. A glance at the 9 to 5+4, or 11 to 6+5 lists will show that the examples found are replete with vowels. The sequence of letters is not a large factor, since the success rate of finding words in reverse is not much worse than the rate for forward extraction. Note also, that having found a set of words from which forward extraction is possible, and another set of the same-length words from which reverse extraction of the same type is possible, there is much more commonality between the two sets than would be expected by chance. For example, we get 86 9-letter words from which 5-letter and 4-letter words can be extracted in both directions, as opposed to the 5 expected by chance. As the list shows, such common words often contain doubled letters, ASSESSEES being a notable example. Another example of great commonality is when extracting three 4-letter words from a 12-letter word, when we get 29 words from which extraction can be done both forwards and backwards, when only two might have been expected. In this case, the liberal sprinkling of vowels is suggestive--the examples have exactly 50 per cent of their letters as vowels, compared to 40 per cent for dictionary words taken at random.

## Example Results

The table given above is important because only it shows the quantitative results of the research--i.e., the conditions under which examples are easy to find, and (by omission) the conditions for which it was impossible to find examples. The following lists are pruned to degrees ranging from none to well over 99 per cent. The basis of the pruning is subjective. I have preferred expressions known to me, and this may involve preferring a well-known abbreviation like TNT to an obscure word. Where obscure words appear, there is no better alternative. Obscure words, abbreviations, proper names and acronyms are bound to appear when pushing the limits. as when trying to extract 11 words according to the rules from a single word. In many cases where a word may appear to be a proper name, such as sid or don, I have pointed to an alternative meaning.

To discuss the results in detail would take a great deal of space, even allowing one short sentence per category, so I have italicised my own favourites, and leave the reader to browse. Apart from the straightforward extraction of 2,3,..., 8 words from a single word of varying size, I have also extracted in reverse. Furthermore, I have found words which yield the same pattern of words in both directions at once, e.g., 12-letter words which break into three 4-letter words in both directions. Next, I found words that break into two different patterns, e.g., 15-letter words which break into three 5-letter

words and also five 3-letter words, variously backwards and forwards. Finally, I managed to find some words from which three different patterns can be extracted: alternades three times over.

I should not fail to mention the very apt ALTERNATION and ALTERNATIONS. OOLOOPOOLOOO is of course a palindrome; it also breaks into OLOOLO and OOPOO, both palindromes, and you get the same result with reversed extraction. They in turn break down into OOL (vf) and LOO, and OPO (OED) and OO (Web3), again similarly in reverse. So without descending a further level, we have a three-level multiple alternade, with both forward and reverse properties at the top two levels. END-ARTERIALS is a double (mixed) alternade, and also multilevel. SEPARATENESS is a good example of a triple: it gives reasonable 4-letter words both forwards and backwards, and some recognisable 3-letter entities forwards.

In the following lists I have sometimes quoted a somewhat arbitrary source when the word in question does not appear in very many sources. Where no source is quoted, the word should appear in more than one of the OED, Webster 2 and 3, American Heritage, and Pulliam.

abbr = abbreviation	Bl = Bloomsbury Thesaurus	Ch = Chambers
gen = genitive	Lo = Longmans	obs = obsolete
Pcon = Palindromicon	pl = plural	pname = personal name
Pull = Pulliam	Sted = Stedman	TAW = Times Atlas of World
TEA = The Electronic Alveary		vf = OED variant form

### 8 letters to 4 + 4 (all in Pulliam)

ABLATION = ALTO + BAIN  
 BARRICOS = BRIO + ARCS  
 BREADNUT = BEDU + RANT  
 CHAINLET = CANE + HILT  
 ENLISTEE = ELSE + NITE  
 GROUNDED = GONE + RUDD  
 OPTATION = OTTO + PAIN  
 PIEDNESS = PENS + IDES  
 POORNESS = PONS + ORES  
*SCHOOLED = SHOE + COLD*  
 SOUPLIKE = SULK + OPIE  
 SPOOKIES = SOKE + POIS

### 9 letters to 5 + 4 (all in Pulliam)

ALLODIARY = ALDAY + LOIR  
 BARBARIAN = BRAIN + ABRA  
 BLUISNESS = BUSES + LINS  
 GREENIEST = GENET + REIS  
 PORPOISES = PROSS + OPIE

and two more:

*BALLOONED = BLOND + ALOE*

### 10 letters to 5 + 5

BARRACLADE = BRALD (OED) + ARCAE  
 COLLOPCAKE (OED) = CLOCK + OLPAE (Pull)  
 GROUNDEDLY = GONEL (OED) + RUDDY  
 PRAETORIAL = PATRA (Ch, Greek root of allopatric) + REOIL  
 SPALLATION = SALTO + PLAIN (all Pulliam)

BARRETRY = BRER + ARTY  
 BLOODIER = BODE + LOIR  
*CALLIOPE = CLIP + ALOE*  
 CHEERLED (AmHer) = CERE + HELD  
 FARCETTA = FRET + ACTA  
 IMPASSES = IPSE + MASS  
 ORNATION = ONTO + RAIN  
*PLEONASM = PENS + LOAM*  
 PORPOISE = PROS + OPIE  
 SHOALIER = SOLE + HAIR  
 SPARSEST = SASS + PRET  
 TAUTNESS = TUNS + ATES

ATMOSTEAL = AMSEL + TOTA  
 BLOODWEED = BODED + LOW  
 CHAUSSEES = CASES + HUSE  
 PALMARIAN = PLAIN + AMRA  
*THREENESS = TREES + HENS*

*TRUANCIES = TUNIS + RACE*

CHEERLEADS = CERED + HELAS  
 COURTLIEST = CUTIS + ORLET  
 PLAYScheme (OED) = PASHM (fur for pashminas) + LYCEE  
 SCORTATION = SOTTO + CRAIN  
*STARPULLEY (OED) = SAPLE + TRULY*

**10 letters to 4 + 3 + 3**

ANOMALIPED = AMID + NAP + OLE  
 CALAMITIES = CATS + AMI + LIE  
*DENATURANT* = *DART* + *ETA* + *NUN*  
 HALOGENATE = HONE + AGA + LET  
 LATEWHILES (Pull) = LEIS + AWL + THE  
 MANIFESTOS = MISS + AFT + NEO (Pull)  
 MEGALOCYTE = MACE + ELY + GOT  
 PHILOSOPHY = PLOY + HOP + ISH (= exit) also PSILOSOPHY  
 BENEVOLENT = BELT + EVE + NON  
 COLONOPEXY = COPY + ONE + LOX  
 DENATURATE = DARE + ETA + NUT  
 LATELINESS = LENS + ALE + TIS  
*LEGITIMATE* = *LIME* + *ETA* + *GIT*  
 MANIPULATE = MILE + APA + NUT  
 PALUDICOLE = PUCE + ADO + LIL (vf, Pull)  
 PINACOCYTE = PACE + ICY + NOT

**11 letters to 6 + 5**

*ALTERNATION* = *A TRAIN* (US song, *Take the...* ) + *LENTO*  
 BURRAMYIDAE (Longman's Illus Animal Encyclo) = BRAYDE (obs. braid) + URMIA (BI)  
 CELLOBIOSES (pl cellobiose) = CLOISS (vf) + ELBOE (vf)      CELLOBIOSUS (Sted) = CLOISS (vf) + ELBOU (vf)  
 DEERBERRIES (?, hyp?) = DEBRIS + ERERE (Pcon)      OOLOOPOOLOO (Pcon) = OLOOLO (Pcon) + OOPOO (Pcon)  
 PRE-ORDAINED = PERAND + RODIE  
 PROALSATIAN (presume hyphen) = POLAIN (Ch, Old French knee armour) + RASTA  
 SCARLET SEED = SALTED + CRESE (obs. crease)  
 SPARVER-WISE = SAVRIE (obs) + PREWS (obs)  
*UNPATTERNED* = *UPTEND* + *NATRE*  
 SPALLATIONS = SALTOS + PLAIN  
*TRIENNIALY* = *TINILY* + *RENAL*

**11 letters to 4 + 4 + 3**

COLONOMETER (Sted) = COME + ONER + LOT  
 DENATURANTS (Sted) = DART + ETAS + NUN  
 DILATOMETER = DAME + ITER + LOT  
 GYNAEOLATER (Pull) = GALE + YEAR + NOT  
 LEGITIMATES = LIME + ETAS + GIT  
 PAPAL STATES = PATE + ALAS + PST  
 SMOKE HELMET (OED) = SKEE + MELT + OHM  
*DEHUMANISER* (derived) = *DUNE* + *EMIR* + *HAS*  
 DERIVOMETER (OED) = DIME + EVER + ROT  
 FILARICIDES (Sted) = FACE + IRIS + LID  
*IMPRISONING* = *IRON* + *MING* + *PSI*  
 METAPOLITIC = MALI + EPIC + TOT  
*ROMANOSCOPE* (Sted) = *RASP* + *ONCE* + *MOO*  
 VASORELAXED (Sted) = VOLE + ARAD + SEX

**12 letters to 6 + 6**

*ALTERNATIONS* = *A TRAIN* (US song, *Take the...* ) + *LENTOS*

**12 letters to 4 + 4 + 4 (based on Pulliam)**

BETACAROTENE (AmHer) = BARE + ECON (Ch, abbr) + TATE  
 COLONOMETERS (Sted) = COME + ONER + LOTS  
 DISENHERISON (OED) = DEES + INRO + SHIN  
 GLORIOUSNESS = GRUE + LISS + OONS  
*LEPIDOMELANE* = *LIMA* + *EDEN* + *POLE*  
 LOCOMOTILITY = LOTI (AmHer) + OMIT + COLY  
 MANIPULATORS = MILO + APAR + NUTS  
*MODERATENESS* = *METE* + *ORES* + *DANS* (buoys etc, OED)  
 PACIFICATORY = PICO + AFAR + CITY  
 SCOLOPACIDAE (Web2) = SLAD + COCA + OPIE  
 SEPARATENESS = SATE + ERES (OED) + PANS  
 TELEPOLITICS (OED) = TELI + EPIC + LOTS  
 VOMERONASALE (Sted) = VENA + ORAL + MOSE  
 CELADON GREEN (?, light green) = CANE + EDGE + LORN  
 DILATOMETERS (Sted) = DAME + ITER + LOTS  
 DISINHERISON = DIES + INRO + SHIN  
*LAMINARINASE* = *LIRA* + *ANIS* + *MANE*  
 LITERARINESS = LERE + IRIS + TANS  
 MACERATIVELY (Sted) = METE + ARIL + CAVY  
*METAPOLITICS* = *MALI* + *EPIC* + *TOTS*  
 OSCULATORIES = OUTI (BI) + SLOE + CARS  
*SAPONARINESS* (OED) = *SORE* + *ANIS* + *PANS*  
 SEMIVALENTLY (Sted) = SILT + EVEL + MANY  
 SILICONONANE (Web2) = SINA + ICON + LONE  
 UTEROVAGINAL = URAN + TOGA + EVIL  
 VOMERONASALS (Sted) = VENA + ORAL + MOSS

**12 letters to 3 + 3 + 3 + 3 (some of an all-Pulliam selection)**

ADAPTATIONAL = ATO + DAN + ATA + PIL  
 COLLINEARITY = CIR + ONI + LET + LAY  
 COMPANIONATE = CAN + ONA + MIT + POE  
 CONNUBIALITY = CUL + OBI + NIT + NAY  
 CRANIOLOGIST = CIG + ROI + ALS + NOT  
 ETHEREALNESS = ERN + TEE + HAS + ELS  
 GLACIOLOGIST = GIG + LOI + ALS + COT  
*HEAVENWARDLY* = *HER* + *END* + *AWL* + *VAY*  
 LABIOPALATAL = LOA + APT + BAA + ILL  
 MISDEMEANING = MEN + IMI + SEN + DAG  
 PARTITIONING = PIN + ATI + RIN + TOG  
 PATHOPOIETIC = POE + APT + TOI + HIC  
 SECRETIONARY = SEN + ETA + CIR + ROY (= prince)  
 SUBTERRANEAN = SEN + URE + BRA + TAN  
 TROPHOBOTIC = THO + ROT + OBI + PIC  
 ARTERIARCTIA = ARC + RIT + TAI + ERA  
 COMPANIONAGE = CAN + ONA + MIG + POE  
 CONGENIALITY = CEL + ONI + NIT + GAY  
 CONTINUATELY = CIT + ONE + NUL + TAY  
 DEFLATIONARY = DAN (judo) + ETA + FIR + LOY  
 FLUOROGRAPHY = FRA + LOP + UGH + ORY  
 GLACIONATANT = GIT + LOA + ANN (Ch = annates) + CAT  
 HELIOCULTURE = HOT + ECU + LUR + ILE  
 LIBRARIANESS = LAN + IRE + BIS + RAS  
*PANTALOONERY* = *PAN* + *ALE* + *NOR* + *TOY*  
 PASSEMEASURE = PES + AMU + SER + SAE  
 PETTICOATERY = PIT + ECE + TOR + TAY  
 SPELEOLOGIST = SEG + POI + ELS + LOT  
 SUPERSALIENT = SRI + USE + PAN + ELT  
 UNBELIEVABLE = ULA + NIB + BEL + EVE



**18 letters to 6@3**

AGROMETEOROLOGICAL (OED) = ATO (vf) + GEG (vf) + ROI (Web2) + ORC + MOA + ELL  
 ANTIHISTAMINERGICS (Sted) = ASE + NTR (Ch, Egyptian nitre) + TAG + IMI (Web2) + HIC + INS (OSPD)  
 HAVE A BACHELOR'S FLAT (BI) = HAR (Pull) + ACS (Ch, Active Control System) + VHF (AmHer) + EEL + ALA (Web2) + BOT  
 LACRIMOGUSTATORIES (Sted) = LOT + AGO + CUR + RSI (Pull) + ITE (vf) + MAS  
 MALEYLACETOACETATE (Med) = MAC + ACE + LET + ETA + YOT + LAE (vf)  
 PSEUDOPHENANTHRENE (Web2) = PPT (AmHe) + SHH (Book of Interesting Words) + EER (obs ere) + UNE (vf) + DAN (vf) + ONE  
 PSEUDOPRESENTIMENT (OED) = PPT (AmHe) + SRI + EEM (vf) + USE + DEN + ONT (Lo)  
 ROTARY CLOTHES-DRIER (OED) = RCS (Lo) + OLD + TOR + ATI (Web3) + RHE (vf) + YER (vf)  
 TO CAST ASIDE ONE'S EAR (OED) = TAN + OSE + CIS (Web3) + ADE (Web2) + SEA + TOR  
 TO LIVE ON ONE'S NERVES (OED) = TON + ONE + LOR (OED) + INV (Ch, = invenit) + VEE + ESS

**20 letters to 4 + 4 + 4 + 4 + 4**

RIBOFURANOSYLADENINE (Sted) = RUSE + IRYN + BALI + ONAN + FODE

**21 letters to 7@3**

DISPROPORTIONATEDNESS (OED) = DOT + IRE + STD (Ch, standard) + PIN + ROE + ONS (obs once) + PAS (= precedence)  
 IMAGINATIVE JOURNALISM (BI) = ITR (Pull) + MIN (OED, obs verb) + AVA (OED, spirit) + GEL + IJI (TIG) + NOS (vf) + AUM (vf)  
 LAY SALT ON SOMEONE'S TAIL (Ch) = LON (vf) + ANE + YSS (vf) + SOT + AMA + LEI + TOL  
 PLASMIDIOPHOROMYCETES (Outline of Plant Classification, Sandra Holmes) = PIM (vf) + LOY + APC (Ch, Armoured Personnel Carrier) + SHE + MOT (witty saying) + ORE + DOS (obs does)  
 PUT SALT ON SOMEONE'S TAIL (Ch) = PON (= upon) + UNE (vf) + TSS (= typescript) + SOT + AMA + LEI + TOL

**24 letters to 8@3**

ANTIHYPERCHOLESTEROLEMIC (Sted) = ARE + NCR (National Cash Register coy or No Carbon Required paper) + THO + IOL (vf) + HLE (Ch, Old Norse basis of alee) + YEM (vf) + PSI + ETC  
 AS IF ONE'S LIFE DEPENDED ON IT (BI) = ALN + SID (vf) + IFE + FED + ODO (half-bro of William 1 or shape-shifter in DS9) + NEN (vf) + EPI (Pull) + SET  
 BASTARD MITHRIDATE MUSTARD (OED) = BIE (vf) + ATM (AmHer) + SHU (vf) + TRS (Lo) + AIT + RDA (Sted) + DAR + MTD (Ch, Moving Target Detector)  
 BOOKS OF COUNCIL AND SESSION (OED) = BOD + OUS (vf) + ONE + KCS (Lo) + SIS + OLI (vf) + FAO (Ch, UN Food & Ag Org) + CNN (Ch, Cable News Network)  
 HYPERBETALIPOPOTELNEMIC (W93-238) = HAT + YLE (vf) + PIL (vf) + EPN (a word in Web3 addenda) + ROE + BPM (?) + ERI (vf) + TOC (vf)  
 HYPERCHOLESTEROLEMICALLY (Sted) = HLE (Ch, Old Norse basis of alee) + YEM (vf) + PSI + ETC + REA + CRL (TEA) + HOL (vf) + OLY (vf) [also ...STERI... and HIL (vf)]  
 IF THE WORST COME TO THE WORST (OED) = IST + FTH (Ch, = fathom) + TCE (Lo) + HOW + EMO (Roget) + WER + OTS (?) + ROT  
 LYMPHOGRANULOMA INGUINALE (OED) = LAN (vf) + YNG (vf) + MU'U (Ch, Hawaiian dress) + PLI (Ch, Fr basis of plait) + HON + OMA (Med) + GAL + RIE  
 NOT SEE THE WOOD FOR THE TREES (Ch) = NET + OWH (vf) + TOE + SOT + EDR (?) + EFE (vf) + TOE + HRS (AmHer)  
 TAKE SOMEONE TO THE CLEANERS (Ch) = TOC (vf) + ANL (Ch, Anti-Nazi League) + KEE (vf) + ETA + SON + OTE (vf) + MHR (Ch, Member House of Representatives) + EES (vf)