THE COMMONEST ALPHOMES

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An alphome consists of the letters of a word placed in alphabetical order. AEGINRST, AELRST and others have been the subject of intensive work over many years, the object being to make as many words as possible using each letter just once per word. Although I agree that these strings were the most common (or thereabouts) of their length, I note that the lists produced were more than an order of magnitude larger than the number of occurrences even in the largest dictionary I have seen. For example, in a good dictioary, words made from AEGINRST will appear about six times, yet *Making the Alphabet Dance* lists 157 permutations as valid words. (I prefer 'permutation' to 'transposal', used in Word Ways to denote rearrangement of letters--to me the latter means exchange of rows and columns, or of letters in transcription errors.) By my count, in Pulliam there are a dozen strings of equal or greater frequency. So I had some questions:

- Why had a particular string, and not any of the others, always attracted attention in Word Ways?
- What right has one to expect that a string appearing perhaps six times (compared to five times for a number of others) would be more likely to produce a larger total when striving for over 100 words?
- Would different dictionaries give different top strings?

The lists below help to answer such questions. First, however, it is important to understand that any numbers of my own are indicative, not definitive. The numbers are not strictly comparable, due to plurals, other derived forms, different treatment of hyphenations, and not least the problem of different editions, which has often led me to search in vain for a word that was said in Word Ways to be in a particular dictionary. The five dictionaries are the Oxford English Dictionary, Webster's New International Dictionary of the English Language (Second Edition), Stedman's Medical Dictionary, The Complete Word Game Dictionary by Tom Pulliam and Gordon Carruth, and the Official Scrabble Players Dictionary. The OSPD has somewhat over one hundred thousand entries. The OED, not counting variant forms, has about three-and-one-half times as many entries as the OSPD, and the other three dictionaries have about twice as many.

Readers who wish to research the dozens of alphomes in this article as thoroughly as AEGINRST will have to look up anywhere from 24 (for four-letter alphomes) permutations to over three million (for ten-letter

ones) in, say, one hundred sources--countless hours of permutational pleasure!

After toying with various ways of presenting the results of my labours, I decided simply to present them uncharted. For each dictionary the most common alphome(s) are presented as a block. For example, ACERT shares the top place for Webster and Stedman, but is not amongst the top half-dozen alphomes in the other three dictionaries. A single space between blocks of alphomes indicates that alphomes in the second block each have one fewer permutations (in Webster, ACERT, AGNOR and EERST have one more permutation than AELPT does). Similarly, two (or more) spaces between blocks mean that the alphomes in the second block each have two (or fewer) permutations (in the OED, AELST, AERST and EINST have three more permutations than AEPRS does). As for actual numbers, in the centre three columns the top alphome generates about nine permutations for the shorter words, decreasing to four for words of length ten. The top alphome for the OSPD usually has at least as many permutations as it does for the centre three dictionaries, and the top alphome for the OED ranges up to twice as many.

These numbers may strike the reader as being very small in view of the number of permutations listed in Word Ways for AEGINRST and AEINRST. The reasons are that the very long lists have many inferred forms of nouns and verbs (I'm just dying to spot 'thou e-mailest'!), words from quotations in the OED are used, and there are words from many sources other than the well-known dictionaries, including foreign ones. Look at the breakdown for the AEGINRST and AEINRST lists:

Total words	157	156
Well-known dictionaries	29	38
Specialised dictionaries	28	13
Foreign names	14	4
English names	18	3
Places	5	4
Foreign words	1	17
Other	5	21

Other, in the case of Darryl Francis, is mainly non-dictionary phrases such as "TEARS IN her eye". (It is only fair to point out that, in other contexts, authors may have much stricter rules, as when Jeff Grant castigates Susan Thorpe and myself in the November 1998 Colloquy.)

The reader might wish to draw lines connecting the same alphome in different dictionaries, or assign rank numbers to each block, then calculate the most common alphomes) over the five dictionaries. However I do not assume this would make the results much clearer. The fact that an alphome is seen in four of the dictionaries but not the fifth may not be very significant, as it might have been next to appear had the next block of alphomes been listed.

LENGTH 4 (24 permutations if all letters different)

OED	Web 2	Stedman	Pulliam	OSPD
DEIR	AELM	AEST	ABEL	AEST
EILS	AELT		AELM	
	AILR	OPST	AELN	AERS
AEFL			AELT	
AELM	ABEL	ABST		AILR
DEIL	AEMN	AELS	ADER	ASTW
DERY	AENT	AEMT	AENT	OPST
	AEST	AERS	AEST	OSTW
	ANTU	AILR	AILM	
	ASTW	ARST	AILR	
		EILV	AILT	
		ENOS	EELS	
		ENST	EILS	
		EORS		
		ERSU		

Making the Alphabet Dance (p 125) gives ABEL, AELS and AERS as the most permutable alphomes in Webster's 2nd and 3rd combined (including plurals). It lists (p 132) all 24 permutations of AEST as valid words. AELS had 13 permutations listed in W87-195.

LENGTH 5 (120 permutations if all letters different)

OED	Web2	Stedman	Pulliam	OSPD
AELST	ACERT	ACERT	ACERS	AEPRS
AERST	AGNOR	AELST		
EINST	EERST			AELST
		ABEST	ACOST	
	AELPT	AEPRS	AEPRS	
		EERST		ACERS
AEPRS	ADERT	EINRS	ABERS	AELPS
EERST	AEGLR		ACDER	AELRS
	AELPS		AEHLS	EIPRS
AEHRT	AELRT		AELPT	
	AELST		AERST	
ACERS	AEMRT		AGNOR	
	AIRST		EERST	

Note that EILSV (Elvis!), in W93-19, does not appear. *Making the Alphabet Dance* (p 125) gives AELST as the most permutable alphome in Webster's Second and Third combined. AELST is in W87-197 (60 permutations), AERST is in W97-198 (63 permutations) and AEPRS is in W79-172 (21 permutations).

LENGTH 6 (720 permutations if all letters different)

OED	Web2	Stedman	Pulliam	OSPD
AEERST	AELRST	ACERST	ACENRT	AELRST
AEGINR			AENPRT	
AELRST	ADELNR	AELPST		
EERSTY	ADERRT		AEGINR	ACEPRS
	AEERST			EINRST
EINRST	AENPRT	ACEPRT	ACELRT	
EOPRST		ADEPRS	ADEIPR	ACERST
	AACINR	AEGINR	ADERRT	AELPST
	ABDELR	AEPRSS	AEERST	AEPRSS
	ACENRT	CERSTU	AEILNV	
	AEELRS	EILNST	AELRST	
	AEILNV	EIMRST	AELRTT	
		EINRST	CEORST	
		EIPRST		

No attempts on permutations of length 6 are given in W98-163. *Making the Alphabet Dance* (p 125) gives AELRST as the most permutable alphome in Webster's Second and Third combined.

LENGTH 7 (5040 permutations if all letters different)

OED	Web 2	Stedman	Pulliam	OSPD
ADEIPRS	AEGINST	ADEINST	AEIPRST	AEGINRS
		EIPRSST		AEINRST
ADEINRT	ACEILRU		ADEEGNR	
AEINRST	ADEEGNR	AEILNPS	ADENRTU	ADEIRST
AELPRTY	AEELPRT	AEILRST	AEGINRT	AEIRSTT
EOPRSTU	AEILNRT	AEINRST	AEGINST	EEIMPRS
	AEINRST	AEIPRST	AEILNRT	EIPRSST
AEEHNRT	AELPRST		AEINRST	EORSSTU
AEENPRT	BDENORU		AEINRTT	
AEEPRST	CEINORT		AELPRST	
AEGINRT			DEIOPRT	
AEILNRT				
EHIRSTT				

Making the Alphabet Dance (p 125) gives AEINRST as the most permutable alphome in Webster's Second and Third combined. 156 permutations are given in W98-163. AEIPRST is in W81-103. ADEELRY, which does not appear above, was credited with 9 permutations in W94-103.

LENGTH 8 (40,320 permutations if all letters different)

OED	Web2	Stedman	Pulliam	OSPD
AEGINRST	ACEEINRT	AEGINRST	ACEINORT	AEGINRST
	ACEILNOR			
	ACEINORT	ACEGINRT	ACEEINRT	AEEGNRST
	ADEEGNRU	ACEINOST	ADEEINRS	AEGILNRS
AEILNPRT	ADENPRSU	ACEINRST	AEELMNSS	AEGILNRT
	AEIMNPRT	AEEGNRST		AEINPRST
AAEIMNRT	AEINORST	AEELMNSS	AAEGMNRT	
ACEINORT	EEILNSSU	AEGILNRS	ACDEERST	ACEINRST
AEGILNRT		AEGILNRT	ACEGINRT	ACINNOST
AEILPRST		AEILNOST	AEGILNRT	AEEIRSTT
		AEINRRST	AEGINRST	AEELMNSS
		AEIPRSST	AEIMNPRT	AEILMNST
		CDEENORS	AEINORST	AEILNRST
		DEEGINRS	EGIILNRV	AEINRRST
		EIOPRSST		AEIPRSST
				AELPRSST
				AEORRSST
				CEEPRSST
				DEEGINRS
				DEEIMPRS
				DEIOPRST
				EEINRRST

Making the Alphabet Dance (p 125) gives AEINRSTU (not shown above) as the most permutable alphome in Webster's Second and Third combined. 157 permutations of AEGINRST due to Dmitri Borgmann and Jeff Grant are given there as well (pp 126-131). No attempts on permutations of length 8 are given in W98-163.

LENGTH 9 (362,880 permutations if all letters different)

OED	Web 2	Stedman	Pulliam	OSPD
AEEILNPRT	ACEINNORT	AACEINRST	ACEINNORT	ACEEINRST
	AEEIMNRTT			
AACEILNRT	EHIOPRSST	AABCILLRY	AACEILNRT	ABEINORST
ACEEHINRT		AACEILRSV	AADEEPRST	ACEGINRRT
ACEINNRTU	ACDEEIINT	AACEORSTU	ACDEINORT	ADEGGINNR
EFIMORRST	ACEEILNRT	ACEILNRST	ACDENRTTU	AEEILNRST
	ACEIILMNT	ACEIMNRSU	ACEIIMNRT	
ACDEEINRT	ACEIIMNRT	ACEINNORT	ACEILMNSU	71 in next group!
ACEHMOSTU	ACEILOPST	ACEINORST	ADEEILMPR	
ACEINOPRT	ACEINORST	ACIINNOST	AEEGIMNRT	
ADEEILMPR	AEEGIMNRT	ADEILORST	AEEHIRSTT	
ADEIMPRST	AEILNSSST	AEEINPRST	AEEIMNRTT	
AEEGINRST	AEINRRSTT	CEEINORST	AEGILNPRS	

AEEILMNNT CEIIMORST CEIIMORST CEGINNORS
AEEINRSTU DEEGNORRU CEIIMORST
AEGHILNRT EEHIMPRST EEEILMSST
AEILOPRST EEILNOPRT EEILNOPRT
AEIMNRSTT EEILOPRST EEILOPRST
CCEEINORT EEINNOPRT EHIOPRSST
CDEINORTU
EEGINRSTT
EEINNOPRT
EEORSTTTU

AEILNORST, with about 24 permutations in W89-209, and AEIMNORST, with 34 permutations in W90-207, do not appear above. ACEINORST was given 55 permutations in W89-131, and is listed in *Making the Alphabet Dance* (p 125) as the most permutable alphome in Webster's Second and Third.

For words of length 10, the most permutable combinations in the OED are AABEELRRST, AEEEGLMNRT, AEIMNNORTU and DEEENRRSUV. The most permutable combination in Web 2 is DEEENRRSUV. Stedman has a set of five: ABEINRSTTU, ACDEINOORT, ACHIMNOOPT, AEHMOPRTTY, CDEINORSTU. The best in the OSPD is EEEILNSSSV. Note that AEILMNORST does not appear (27 permutations in W86-44).

Beyond words of length 10, there seems to have been little interest in compiling long lists of words having the same letters. This is partly because, after this length, the maximum number of dictionary words that permute into the same alphome becomes very small. *Making the Alphabet Dance* has a list of 41 15-letter twins (p 133), and Kyle Corbin, permitting a few phrases, gave two twins of length 18, one of 17, and seven of 16 (W89-101). I looked for groups larger than pairs and found the following ones. A major problem is illustrated by the length-24 triplet: all three are essentially the same word, formed by permuting the same roots. Were we to do this with P45, we could permute at least PNEUMO, ULTRAMICROSCOPIC, SILICO and VOLCANO to give 24 words with the same alphome. In fact, the longest single-word twin I found is of this nature: ENCEPHALOMYELONEUROPATHICALLY and NEUROENCEPHALOMYELOPATHICALLY from Stedman.

Here are the results of my searches for long alphomes having multiple words, after examining a wide range of dictionaries. Unlabeled words are found in Stedman, and starred ones in the OED.

15 antireticularly, intracelluarity, natriuretically

15 ceroplastically,colpatresically,coreplastically,paleocrystallic (W2)
haptometrically,metatrophically,metropathically,pathometrically
gramophonically*,monographically*,nomographically*,phonogramically(W2)

17 axiobuccogingival, buccoaxiogingival, gingivobuccoaxial
cytohyaloplasmics, psychosomatically*, somatopsychically
phrenosplenically, splenonephrically, splenophrenically

18 axiolinguogingival, gingivolinguoaxial, linguoaxiogingival(Medical dict)

19 acetylsulfanilamide, sulfamylacetanilide, sulfanilylacetamide

The following is a triplet of length 24: ENCEPHALOMYELOMENINGITIS (Book of Intriguing Words), MENINGOENCEPHALOMYELITIS*, and MENINGO-MYELOENCEPHALITIS (Medical Dictionary).

One can understand that an alphome may appear at the top of the OED list, but not feature in any other list (as with ADEIPRS), since the much larger OED has a number of words that other dictionaries do not have. It is more difficult to understand why there is not greater consistency among the other dictionaries. However, there are some surprising omissions in the Concise Oxford Dictionary, and this may be true of some of the dictionaries used in this study. Moreover, only one dictionary that I know of (one of the Collins) actually lists words which recent extensive studies show are used most often, so the choice of words in most dictionaries might tentatively be explained by a mixture of carelessness and eccentricity.

From the tables above, there is usually no compelling choice of string to permute, though sometimes this is due to tiny differences in frequency (a single extra appearance is scarcely compelling). Looking at the actual numbers, the top alphome in the OSPD usually has more occurrences than the top alphome in the other dictionaries (apart from the OED), despite its smaller size--almost as if it were a logological dictionary!