

AEIOU WORDS IN BIOLOGY: PART 2

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9. AEIOU together

AEIOU words in which the five vowels occur together are rare indeed! IOUEA is unique in being unspoilt by any consonants. The only common word is MIAOUED which Dmitri Borgmann, in "Vowel Patterns", describes as "... (mewed) a past tense form explicitly shown in only one dictionary, Webster's New Collegiate Dictionary (Springfield, Massachusetts, 1949)". Double-checking that MIAOUED had not crept into the OED, I found MIEAOU, a 19th century spelling of the word 'miaow', one of several spellings of that word. Without resorting to French words, French place names or French personal names, this appears to be the total of these words. AEIOU words in which any four of the five vowels occur as a cluster are also sufficiently scarce to command attention. In the animal kingdom we find CROCIAEUS, a bug, PLIOAETUS, a bird, MUNROEIA, a moth, and FENGDOUIA and CHENGKOUIA, both trilobites; and from the plant kingdom comes SEQUOIA, a genus of coniferous trees, and BOSQUEIA and CODIAEUM, both tree and shrub genera. The OED offers two obsolete spellings of words, both of which appeared in "Vowel Tetragrams" by Darryl Francis in the August 1974 *Word Ways*: PAUEILLON, a pavilion, and PAUOISE, a shield. There are other words in which the five, or four of the five, vowels occur in a cluster but, having additional vowels, they do not immediately concern us.

10. AEIOU within the space of six letters

Words in which the five-vowel sequence is interrupted by only a single consonant are, predictably, relatively short in length, added to which, this is the only AEIOU category in which the plants contribute as many words as the animals.

6 letters EUNOIA and EUODIA (see Section 3)

7 letters BOULEIA, a trilobite, EUAPION, a beetle, DOULEIA (OED), MOINEAU (Web 2), PAUOISE (see Section 9), SEQUOIA, AEONIUM, BOUETIA, COUEPIA, DOUEPIA, NOUELIA, SOULIEA, all plant genera

8 letters CODIAEUM (see Section 9), DROUETIA, a mollusc, NEOARIUS, a fish, PROEULIA, a moth, THIOUREA (Web 3)

9 letters PLIOAETUS and CROCIAEUS (see Section 9), MNIACEOUS (Web 2) 'moss-like'

11. AEIOU(Y)-consonant patterns

The simplest VC pattern is that in which the five vowels alternate singly with single consonants. These words can have nine

ten, or eleven letters, and conform to the pattern (c)vvcvvcv(c). In the animal kingdom, especially, examples of such ten-letter and eleven-letter words abound, there being around one hundred of them! However, there are only three nine-letter creatures, UPENICOLA, a flatworm, and ONUXICERA and UROMEDINA, both flies, available to join their nine-letter non-animal colleagues: AZORUBINE, UNIRAMOSE and UVAROVITE (all Web 3), ALUMINOSE, ACUMINOSE, UNAGONIZE, UNILOBATE, UNISOLATE and URANOLITE (all Web 2) and, with the IOUAE circular arrangements of their vowels, INOCULATE and ISOBUTANE (Web 3). So, what happens if we impose a circular or reverse-circular vowel requirement on the many ten-letter and eleven-letter words? This exercise results in examples of only five of the ten possible five-vowel arrangements, leaving this field wide open for gap-filling:

AEIOU ATENISODUS and PAREPITOXUS, both beetles, LATERIPORUS,
 a tapeworm
 EIOUA MELIPONULA, a bee, SEMILOCLAR, SEMIPOPULAR (Web 2)
 IOUAE BILOCULATE, BINOCULATE (Web 3)
 UOIEA FURONICERAS, a mollusc, CUDONIGERA, a moth
 AUOIE MANUMOTIVE (Web 2)

Turning our attention to words in which A, E, I, O, U and Y alternate singly with single consonants, we have ADELOGYRINUS, an amphibian, ARIXYLEBORUS, a beetle, CARINODYNERUS and PARIFODYNERUS, both wasps, RETICULOMYXA, a fungus, ALUMINOTYPE, COPULATIVELY, ELUCIDATORY, MOLECULARITY, UROGENITARY, VITUPERATORY (all Web 3), VEHICULATORY (Web 2), DYSEPULOTICAL (Web 2) and ISOBUTYRATE (Web 3), the only such word with a circular vowel arrangement (see Section 8).

Another alternating VC pattern is that in which A, E, I, O and U alternate singly with pairs of consonants. These words can have thirteen, fifteen or seventeen letters and conform to the pattern (cc)vccvccvccvccv(cc). A search resulted in six thirteen-letter words of the pattern vccvccvccvccv: INSUPPORTABLE (Web 3), and INCONSULTABLE, UNCOLLAPSIBLE, UNCONFISCABLE, UNCONSIGNABLE and UNDISSOLVABLE (all Web 2).

No words were found with A, E, I, O, U and Y alternating singly with consonant pairs.

Perhaps the most noteworthy of the other VC patterns is the symmetrical VC arrangement in which the central three letters of the word are three of the five vowels: POLIAENUS and ULEIOTA, both beetles, VANUOIDES, a bug, and ZELIAUROS, a genus of herbs and shrubs.

12. Monoconsonantal AEIOUs

These are words which are confined to having one or more of the same consonant in addition to the five vowels. The only examples found with more than one incidence of the consonant are the molluscs EUSSOIA and UNIONEA, and the beetle EUNONIA, the last two also being animal anagrams!

13. AEIOU isograms

As would be expected, most of the longer words with no repeated letters (solo isograms or nonpattern words) encompass all the letters A, E, I, O U and Y. One noteworthy exception, the fifteen-letter DERMATOGlyphics (Web 3), reputedly the longest non-coined solo isogram, does not contain the letter U. A number of long isograms, including some AEIOU words such as UNCOPYRIGHTABLE, have been coined over the years but, for this exercise, we aim to avoid these words. What constitutes a long isogram? Twelve-letter words are QUESTIONABLY (Web 3) too short to qualify. According to Borgmann in "Long Isograms (Part 1)" in the May 1985 **Word Ways**, thirteen-letter and fourteen-letter isograms should include one of the rare letters J, Q, X or Z in order to be interesting, and he cites QUEBRACHITOLS and AMBIDEXTROUSLY (both Web 3) among his examples. Fourteen-letter isograms are not too difficult to find, despite including UNDISCOVERABLY (Web 3) amongst their number, surely a word as interesting, in its own way, as AMBIDEXTROUSLY? Animals make a significant contribution at the fourteen-letter length with BRACHYPOLEMIUS and MACROXYLETINUS both beetles, SYNWOCKLUMERIA, a mollusc, and PSYCHROLUTIDAE (Oxford Dictionary of Natural History, 1985), a family of fishes. The only fifteen-letter non-coined AEIOUY isogram (equalling DERMATOGlyphics in length) appears to be ENDOLYMPHATICUS (Web 2), a not wholly satisfactory example in that it invariably occurs as part of the two-word designation 'ductus endolymphaticus'. In the February 1991 issue of **Word Ways**, Ed Wolpow brought the seventeen-letter SUBDERMATOGlyphic to our attention, a single citation of which is to be found in the September 1990 issue of the Archives of Dermatology (Vol 126, pages 1159-1160), but it seems likely, at this stage, that this might be just another coined word.

14. Multiple AEIOU

Words in which each of the five vowels appear twice, with no other vowels, are indeed rare and, fortunately, the three offered here are 'clean' in that none of them has a Y. Darryl Francis located two of them in the 23rd edition of Dorland's Medical Dictionary, PSEUDOINTRALIGAMENTOUS and PSEUDOHEMAGGLUTINATION, and reported them in the August 1970 Colloquy. It falls to the animals to complete the trio with USSOLZEWIECHINOGAMMARUS, a genus of crustacean named by Dr. B. I. Dybowski (1833-1930) who, in the 1920s, gave many crustacean genera equally long names, some exceeding thirty letters!

Allowing ourselves a slight diversion by extending this double-AEIOU category to include genus-species word pairs in which the letters A, E, I, O and U occur once in the generic name and once in the specific name, we encounter the tautonymic boat-billed heron COCHLEARIS COCHLEARIS (A Complete Checklist of the Birds of the World, 1984), and a louse, HAEMODIPSUS LYRIOCEPHALUS (Grzimek's Animal Life Encyclopedia), the latter providing a mixed AEIOU-AEIOUY pairing. By travelling to Trinidad, we might be privileged a glimpse of a possibly-unique triple tautonymic AEIOU designation,

one of the subspecies of *Cochlearius* being *COCHLEARIUS COCHLEARIUS COCHLEARIUS* (A Complete Checklist of the Birds of the World).

15 Alphabetical letter string AEIOUs

The word *QUAESTORSHIP* (Web 3) is unusual in that seven of its letters are to be found adjacently in the alphabet (OPQRSTU). *PROPINQUATES* (the OED shows 'propinquate' as an obsolete rare verb meaning 'to draw near') goes further, with an alphabetical string of eight letters (NOPQRSTU).

16 AEIOU transposals

The following eight-letter, nine-letter and ten-letter transposals can be found in Peter Newby's Pears Advanced Word-Puzzler's Dictionary (Pelham Books, 1987) and the eleven-letter ones are in The Dictionary of Anagrams (Routledge & Kegan Paul, 1986), by Samuel C. Hunter.

8 letters *OUTRAISE:SAUTOIRE*

9 letters *AUCTIONED:CAUTIONED:EDUCATION:NOCTUIDAE, AURISCOPE: PARECIOUS, OSSUARIES:SUASORIES*

10 letters *CAUTIONERS:RECUSATION, ENUNCIATOR:UNCREATION, GRAMINEOUS:MARIGENOUS, INOCULATER:ULCERATION, PECULATION:UNPOETICAL, REGULATION:UROGENITAL, UNCANONISE:UNISONANCE*

11 letters *COUNTERVAIL:INVOLUCRATE, DENUNCIATOR:UNDERACTION, IMPORTUNATE:PERMUTATION, MENSURATION:NUMERATIONS, PECULATIONS:SPECULATION, SAVOURINESS:VARIOUSNESS*

17. Rare letters in AEIOU words

Arne Zettersten's analysis of the frequency of letter occurrences in over one million American English words is summarized in The Cambridge Encyclopedia of Language (Cambridge University Press, 1987), by David Crystal. It shows J, Q, X and Z to be the rarest letters, their relative frequency depending on which of fifteen categories of text (religious writing, press reporting, etc.) is considered. The next rarest letters are usually K, V and B.

Dmitri Borgmann found *KOCAJ-BULQIZE*, the name of a town in Albania which incorporates five of these seven letters, in the 1965 edition of The Times Index-Gazetteer of the World, reporting this in "The Improbable" in the November 1968 **Word Ways**. Although far from being a bona fide English word, it is noted here as a unique, albeit hyphenated, AEIOU word. Otherwise, at most three of the seven *JQXZKVB* letter were found in any AEIOU word: *MOZAMBIQUE* (Web 3) which is a type of lightweight dress fabric as well as a location, *LJUBIMOVELLA*, a crustacean, *OBJURGATIVELY* (Web 3), *SKRJABINOPHYETUS*, a flatworm, and *KUZNETZOVVLIA*, a moth.

In an average of the fifteen text categories, Zettersten's analysis found Z to be the least-frequently-occurring letter followed, in order, by Q, J, X, K, V, B and W. In "Antifrequency Words" in the February 1986 **Word Ways**, Borgmann expressed surprise that Z appeared as the least common letter in English text in seven letter counts (sources unspecified), in view of the fact that

Z is the only one of the JQXZ group to appear double in many common words. His surprise is vindicated, at least for AEIOU words in which the letter count order deviates from that above. In these words it is not Z, but rather J and W which are the rarest letters, not only across the AEIOU word spectrum as a whole (around 50 each of J and W), but also when the animal/plant words and the rest are considered separately. Across the spectrum, J and W are followed, in order by Q, K, X and Z. In the animal/plant words, J was followed closely by W and Q before a significant leap to K; in the rest of the words, W was followed closely by J and K before a significant leap to Q. Apart from KOCAJ-BULQIZE, not unexpectedly no word was found which included more than two different letters from the JWQKZX group (omitting B). Only two words were found which included two Js. These, listed in Ed Wolpow's article "Jejuniana" in the February 1984 **Word Ways**, are JEJUNATION (Web 2) and JEJUNOGASTRIC (Blakiston's Gould Medical Dictionary, McGraw-Hill, 4th edition 1979). In its sometimes connotation as the seventh vowel, the rarity of the letter W in these words is of especial interest. The animal genus WEWOKACRINUS, an echinoderm, was one of only two words found which included two Ws, the other being UWAROWITE (Web 3), an alternative spelling of UVAROVITE.

With the letters J and W not having existed in the Latin alphabet, it might be supposed that the substantial number of AEIOU animal and plant names, many of Latin origin, could alone account for the infrequency of occurrence of these two letters in our AEIOU word pool count. This Latin theory is apparently reinforced in that we find J and W to be proportionately rarer in the animal/plant names than in the rest. On the other hand, W and J are also the rarest in the rest words, indicating that the presence of the letters AEIOU may also be acting as a deterring factor on J and W. It would thus seem likely that both influences are at work.

18. A "living fossil" AEIOU

Words sometimes make headlines for reasons other than, or in addition to, logological ones. An item in the New Scientist of 20 March 1993 suggests that a newly-discovered species of the animal genus CEPHALODISCUS may well be considered a surviving member of the graptolites, a group of animals thought to have become extinct around 300 million years ago. This "living fossil" has been named *C. graptolitoides* by P. N. Dilly. CEPHALODISCUS is of logological interest, not only for being an AEIOU word, but also for its symmetrical VC arrangement, cvccvcvcvccvc.

19. The AEIOU "top ten"

Asked to choose just ten AEIOU words, one would have to look to the meanings of the words, as well as to the words themselves. These are some personal favourites:

- NOVANTIQUE (Web 2) a rich sounding, self-contradictory word
 meaning 'new but yet old'
 GRANDILOQUENT (Web 3) a word which rolls off the tongue and
 means 'marked by a lofty, extravagantly colorful, pompous or

- bombastic style, manner or quality esp. in language'
- MUSTACHIOED** (Web 3) deserving of inclusion for the picture it conjures up 'having mustachios' (moustaches - especially large)
- EUPHORIA** for 'happily' bearing the burden of being at once the name of two different animal general, a beetle and a fly, as well as of a genus of trees and shrubs cultivated for their fruit
- IOUEA** the genus of fossil sponge whose logologically-unique name remained undiscovered for so many years (**Word Ways**, May 1993)
- SUPERORGANISM** (Web 3) one of the meanings of this word embraces a unique, enormously-complex life-style 'a colony of social organisms, such as ants, in which the members and castes are integrated in much the same way as the organs of a multicellular individual'
- PERMUTATION** (Web 3) although of wider import, a word which has been used here on several occasions in relation to the 120 ways in which AEIOU can be arranged; we now acknowledge it in its own right
- NOMENCLATURIST** (Web 3) one of the band without whose work, in naming and classifying over the years, this article would have not been possible
- AERIOUS** (OED) yes, the shortest word in which the five vowels are arranged in alphabetical order, but its influence does not end there; its OED definition includes 'airy', homophonically echoed in two of the references

Perhaps **Word Ways** readers can fill out the top ten with a favourite of their own?

20. A Challenge

"Unsociable housemaid discourages facetious behaviour" is the clever title of the article by Ross Eckler in the November 1969 **Word Ways**. This sentence is composed exclusively of AEIOU words and is, seemingly, the only such sentence to have appeared in **Word Ways** to date. To accompany it, I offer "Ambidextrous excruciator inoculates outpatients unmethodically". (EXCRUCIATOR, in Webster's Second, means 'a tormentor'.) Can readers devise other sentences composed solely of AEIOU words?

21. A collective noun

Finally, it surely befalls us to bestow upon our AEIOU friends a suitable collective noun...a **VARIOUSNESS** (Web 3) of AEIOU words, perhaps?

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THE GUINNESS BOOK OF NAMES

Is onomastics a popular subject in Great Britain? Leslie Dunkling's book with the above title has just been reissued (in paperback for \$14.95) in its 6th edition, surely a record for books on wordplay or related topics. It still contains one of the widest assemblages of names I am aware of: in addition to many chapters on the standard topics of place-names and personal names, Dunkling discusses street names, pub names, house names, trade names, pop group names, cocktail names, ship names, dog and cat names, field names, hat names and even names for kisses (Royal Cheek, Side Slip, Double Squeak, Flesh Press, Croyden Peck)! I also like his inclusion of sidebar quotations relative to onomastics taken from a wide variety of novels and other books. There's no doubt that Dunkling is a listomaniac, as the book is peppered with specialized collections (for example, the 150 commonest British house names, led off by The Bungalow (4485), The Cottage (4049), and Rose Cottage (2936)). I especially welcome his statistical profiles of the popularity of 1,000 names given to babies born between 1900 and 1990: Fiona and Amanda peaked in 1965, Jennifer in 1950, and Dorothy in 1925. Would that a similar set of data could be compiled for American given names!