

AEIOU WORDS IN BIOLOGY: PART 1

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Less than a handful of major articles dealing with AEIOU words (words in which each of the five vowels A, E, I, O and U occurs once) have appeared in **Word Ways** over the years. In November 1969 Ross Eckler, in "Unsociable Housemaid Discourages Facetious Behaviour", compiled a type-collection of such words from Merriam-Webster dictionaries and other sources. In May 1979 David Shulman, in "An AEIOU Examination", extracted words from the 1973 printing of Funk & Wagnalls Standard College Dictionary. In May 1990, a welcome compilation of AEIOU word records was featured in Chris Cole's "Word Records From Webster's Third". In August 1993, John Foster listed AEIOU words allowable in Scrabble in "Of Vowels and Things". Human nature being what it is, word lists and records such as these inevitably act as targets, the aim being to add to, or improve upon, them. Thus the Webster's Third challenge was met by Dan Tilque in the November 1990 Colloquy, and this, together with a further survey of Webster's Third in the February 1993 Colloquy, included additions and improvements to some of the AEIOU word records in Chris Cole's article. It would now appear that it largely only remains for someone to tackle the OED before the major dictionary route to AEIOU words is virtually exhausted. In order to find new AEIOU words, therefore, we must turn our attention to more specialised English-language references.

The current exercise began with an in-depth search for AEIOU words from a chosen specialised subject, described in the following paragraph. The resulting words were then considered in conjunction with other known AEIOU words. The aim of this was twofold: firstly, to determine the overall shortest and longest AEIOU words in a variety of categories, producing a series of English-language reference works AEIOU word records to act as targets against which newly-discovered AEIOU words can be tested in the future; secondly, to compile a series of other logologically-interesting AEIOU word categories. This 'multiple-reference' approach in no way seeks to detract from the searches for AEIOU word records within single references such as Webster's Third Unabridged, but is presented as a separate exercise.

But which subject to choose for an in-depth search? Ideally it should be a clearly definable one which leaves no room for doubt concerning the eligibility of a word for inclusion (e.g., the towns in a particular country or state). It should also be one which is obviously going to be productive. The one chosen was the hierarchical classification of the animal and plant king-

doms, several words from which have already appeared as AEIOU word records. For the animal kingdom, this involved a hand search of, amongst other books, the eight volumes of Nomenclator Zoologicus (NZ) which encompass well in excess of 300,000 entries. Published by the Zoological Society of London, NZ is a list of the names of genera and subgenera in zoology from the 10th edition of Linnaeus's Systema Naturae (1758) onwards. The plant kingdom search was confined to the flowering plants, ferns and fungi and, more specifically, to two definitive botanical works: the 40,000 entries in The Dictionary of the Flowering Plants and Ferns (FPF) which "attempt[s] to cover all published generic names from 1753 onward and published family names from 1789"; and Ainsworth & Bisby's Dictionary of the Fungi (ABDF), with 16,500 entries, is "the most complete listing of generic names of fungi available." These searches produced an amazing 3450 AEIOU taxa words (3017 animal, 523 plant) ranging in length from 5 letters to 20 letters and including representatives for 100 of the possible 120 permutations of A, E, I, O and U. The majority of the animal kingdom words were of generic status as were almost all the plant kingdom words (plant families end in -eae which rules them out). The multitude of individual animal and plant species names was not researched and any mention of species names is pertinent only to a particular AEIOU configuration under discussion.

Before embarking on the various AEIOU word categories, let us first take stock of which of the 120 permutations of A, E, I, O and U are accounted for and which are not. The November 1969 type-collection covers 104 of the 120 permutations. Since that time, readers have managed to fill 12 of the 16 gaps (see Colloquy for February 1970 and 1975, May 1977 and 1979, and August 1984), although certain of the offerings are less than satisfactory, viz: the hyphenated SEA-LIQUOR and PICTURE-BOARD for EAIUO and IUEOA; ORNACIEUX, a French place name, for OAIEU and, least satisfactory of all, VILLAGE BURROW (a 'special combination' in the OED) for IAEUO. Something of a question-mark also hangs over OPAQUEING, for OAUEI, inferred from OPAQUE which Webster's Third lists as a transitive verb as well as a noun. In any case, animal alternatives are now on hand for two of these arrangements. For OAUEI we can offer ORTHAULEXIS, a beetle, and PROCARDUELIS, a bird; for OAIEU, there is a choice ranging from HOAZINEUS, a louse, to HOFFMANNIELLUS, a spider (note the three doubled letters) and, with a Y, GYMNORHACHICERUS, a fly. It also falls to the animals to fill AEIOU, until now an eye-catching void situated immediately after AEIOU; the honour goes to a mollusc, LAEVI-TURBO. To sum up, we still need a single word for IAEUO, non-hyphenated words for EAIUO and IUEOA, and words for AUIEO, IAUEO and IEAUO. So near and yet so far!

Some of the twenty categories of AEIOU words listed in this article will be familiar to readers; others are new. All animal and plant taxa are in NZ, FPF or ABDF unless stated otherwise. If the word source is a dictionary, the order of usage is Webster's Third, Webster's Second, the OED and 'Other'. In the few cases where it proved impossible to discover which vernacular name

to assign to a particular genus, the name of the group to which the genus belongs has been given. Fossil animal and plant taxa are not distinguished from extant taxa.

1. AEIOU in order

Some fifteen or so 'Y free' such words have been noted from various English-language dictionaries but, in one fell swoop, animal and plant genera enable us to more than triple the number of words in this prestigious category, with no fewer than 40 additions (39 animal, 1 plant). The longest of all these words is the 14-letter LAMELLIGOMPHUS, a dragonfly, which improves on the 11-letter words ABSTENTIOUS (Web 3) and FRACEDINOUS (Web 2). Had it not been for their intrusive Ys, we could have offered the 17-letter ARGENTINORHYNCHUS, a beetle, and the mighty 18-letter PHRAGELLIORHYNCHUS, a protozoan. Turning our attention to the shortest words, we find that animals and plants are not in contention. At first glance it would appear that the 8-letter CAESIOUS (Web 3) 'having a blue color very low in chroma' takes the crown but, no, this must surely go to the 7-letter AERIOUS, albeit an obsolete word. Both were cited in "Vowel Patterns" in Dmitri Borgmann's Language on Vacation (Scribner's, 1965) and, although he did not specify a source for it, AERIOUS is in Webster's Second (undefined) and the OED 'Of the nature of air, airy; =AERIAL, of which it may be viewed as a by-form of earlier date'.

2. AEIOU any order

The 5-letter IOUEA, a fossil sponge genus previously mentioned in the May 1993 **Word Ways**, improves upon the 6-letter words EUNOIA, defined in the 24th edition of Stedman's Medical Dictionary (Williams & Wilkins, 1984) as a 'Rarely used term denoting a normal mental state' and EUODIA, a genus of trees or shrubs. The longest words have 17 letters: SULPHONPHTHALEINS (Web 2), cited by Borgmann in "Vowel Patterns", and ENTWICKLUNGSROMAN (Web 3), cited by Tilque in the November 1990 Colloquy). We can now add three further 17-letter words: SUBPOSTMASTERSHIP (Web 2), STICHARTHROPTERUS, a beetle, and TRICHOPENTARTHURM, another beetle.

3. AEIOU and Y in order

If we treat this category more than HALF-SERIOUSLY (Web 2) by discarding hyphenated words, then ABSTEMIOUSLY (Web 3) with 12 letters, and FACETIOUSLY (Web 3) and PARECIOUSLY (Funk & Wagnalls), both with 11 letters, on the other, present a trio of adverbs which are in no immediate danger of being usurped as the longest, shortest and, possibly, only such words.

4. AEIOU and Y any order

The shortest words have 8 letters: EURYOPIA, defined by Stedman as 'a wide intraocular distance', IALOUSYE (OED), a 14th-16th century form of 'jealousy', EYDOUXIA, a screw-pine, EURYOMIA, a beetle, EUMYOBIA, a fly, and JOYEUXIA, a sponge. Two 16-letter words, CYLINDROCELLULAR (Web 3) and VENTRICULOGRAPHY (Web 3), were cited by Tilque in the November 1990 Colloquy; however,

the 18-letter NONUNDERSTANDINGLY (Web 2) exceeds these, and, to accompany it, we offer the 18-letter HEMIRHABDORHYNCHUS, a fish, SCHIZOBRACHYDESMUS, a millipede, PHRAGELLIORHYNCHUS, a protozoan, and TRICHASTEROPHYLLUM, a genus of trees and shrubs. All these must be vanquished, however, in favour of an extinct crustacean, ANTISTREPHORRHYNCHUS, which has left its mark with 20 letters!

5. AEIOU in reverse order

This is a large animal reserve! Some ten or so 'Y free' such words have been noted from various English-language dictionaries. The current search resulted in 63 additions (52 animal, 11 plant), at once septupling the collection. The shortest of these is the 7-letter SUOIDEA, a superfamily of pig-like mammals, referred to by Borgmann, without its source being given, in an editorial snippet "Backwards Vowels" in the very first issue of *Word Ways* in February 1968. SUOIDEA can be found in *Grzimek's Animal Life Encyclopedia* (Gale, 1972), Volume 13. The 14-letter SUBCONTINENTAL retains its status as the longest word, but is now joined by the 14-letter HUGHSCOTTIELLA, a caddis fly.

6. AEIOU and Y in reverse order

It appears that, despite attempts to find a word which achieves this goal, the genuine 'elusive butterfly', or whatever, has probably yet to be discovered, or coined and then accepted for dictionary inclusion. This particular six-vowel arrangement was dealt with in some detail in November 1968, in the article "Yuoiea" by Alan L. Wachtel, and it has a predominantly animal theme. In order to understand the brief résumé of his article, we need to know that in the hierarchical classification of the animal kingdom **-oidea** is a suffix used to indicate a superfamily composed of a group of different families, and **-idae** is a suffix used to indicate a family. The superfamily and family names are achieved by adding these suffixes to the stem of the type genus.

Wachtel offered two YUOIEA words, the first of these being YULOIDEA. He logically reasoned that adding **-oidea** and **-idae** to the stem, *jul*, of the type genus JULUS, a genus of millipedes, produced JULOIDEA, a superfamily of millipedes, and JULIDAE, a family within it. IULOIDEA and IULIDAE are similarly formed from IULUS, a synonym for JULUS, and he found all six words in Webster's Second. He produced convincing evidence that JULUS and IULUS have another synonym, YULUS, but said that this last word is "unacceptable through becoming obsolete by not being used for the past fifty years. Nevertheless, both by analogy to JULOIDEA and IULOIDEA and by the stated rule, it cannot be denied that an obsolete name for the superfamily in question must be YULOIDEA". All well and good, but we are given no evidence that the word YULOIDEA has ever been in use.

His second word was CRYPTUROIDEA, which he cleverly coined to represent a superfamily of "tinamous partridge-like South American birds". He again argued logically by means of synonyms and suffixes, but, as he said, "Since the superfamily contains' only one family, it would be superfluous to name that superfamily ... But

it therefore follows indisputably from the rules of nomenclature that the only possible names would be TINAMOIDEA and its synonym CRYPTUROIDEA". Certainly it 'follows indisputably' but the whole point about superfamilies is that they are composed of more than one family and, never having been the need for one here, presumably it has never existed.

So, for the moment at least, it seems we must be content with second-best in this category. On the one hand we have the choice of five words: DASYUROIDEA (Encyclopedia Britannica, 1987), a superfamily of opossum-like marsupials, or OXYUROIDEA (Lord Rothschild's A Classification of Living Animals, 1965), an order of roundworms, in both of which the six vowels occur in the required uninterrupted reverse alphabetical order, the words only being spoilt by their extraneous A and O respectively; equally frustrating are CYCLOMURICEA, a coelenterate, GYMNOJURINELLA, a fly, or XYLOPHRURIDEA, an ichneumon fly, in all three of which the O and U are transposed. On the other hand we can always be relied upon to rise to the occasion and do so now with the correct, but two-word, designation PHYLUM PORIFERA, sponges!

7. AEIOU circular arrangements

Having devoted so much energy to discovering the longest and shortest words with AEIOU in alphabetical or reverse-alphabetical order, we round off the exercise with a list of the longest and shortest words having the remaining eight circular or reverse-circular arrangements of A, E, I, O and U:

- UAEIO QUARTERNIO, a beetle, QUATERNION (Web 3);
 SQUAMELLIFORM (Web 3)
- OUAEI OURAPTERIX, a moth;
 THOUSANDWEIGHT (Web 3)
- IOUAE BIOVULATE (Web 2), INOCULATE (Web 3), ISOBUTANE (Web 3);
 MISCONSTRUABLE (Web 2)
- EIOUA ERIONULA, a beetle, LEIOFUSA, a protozoan, LEIONURA, a fish, MEIONULA, a bladderwort, PERIOURA, a trilobite;
 TERMINOFLUSTRA, a bryozoan, VENTRICOLUMNAR (Web 3)
- AUOIE AQUOTIZE (Web 3), AUTOCIDE (Web 2), AUTOSITE (Web 3),
 SAUTOIRE (Funk & Wagnalls);
 SANSCULOTTIZE (Web 3)
- EAUOI KERAUNOID (**Word Ways** November 1969, p. 209);
 MEGALUROTHRIPS, thrips, PREACUSTOMING (Web Col 5)
- IEAUO none
- OIEAU MOINEAU (Web 2);
 SCROPHICEPHALUS, a fish, PROKINNEGRAPTUS, a graptolite

8. AEIOU and Y circular arrangements

It is a major task to find any words with this property; here are six: DASYUROIDES, a marsupial rat; PLATYBUNOIDES, daddy longlegs; UNCOMPLIMENTARY (Web 3); UNNOTICEABLY (Web 3); QUODLIBETARY (Web 2); ISOBUTYRATE (Web 3). Note that vowels and consonants alternate, a property to be discussed later in this article.