OILIQO, THE LOOKING-GLASS CRAB

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To set the scene for this leggy crab story, let us first consider a unitary approach to the fallow (but far from exhausted) topic of rotated writing. To begin with some definitions, by "letters" in this context is meant the 52 upper case (u.c.) and lower case (l.c.) letters of the alphabet in their simplest sans-serif forms (in which M and W are stipulated to be exact mutual inverts, the upper and lower loops of B, S and s are stipulated to be equal in size, and so forth); by "words" and "sentences" in this context is meant words and sentences composed of such letters; and by a "rotation" in this context is meant a 180-degree turning in one of the three orthogonal spatial dimensions.

By the Numbers

For convenience, we can assign numbers to these three rotations. Let us say that **rotation #1** flips writing 180 degrees in a right-left direction, as if seen in a mirror placed to one side; that **rotation #2** flips writing 180 degrees in an up-down direction, as if seen in a mirror placed at top or bottom; and that **rotation #3** turns writing 180 degrees in the plane of the page. Let us further say that the notation **[n]**, when used as the central element of a rotation statement, means "is the #n rotation state of," and that like an equals sign it works in both directions; thus, the statement **b[3]q** may be read both as "b is the #3 rotation state of q" and as "q is the #3 rotation state of b."

Counting the non-rotated state, there are a total of four rotation states available to letters. All multiple rotations reduce to one of these, e.g.: [1+2]=[3], [1+3]=[2], [2+3]=[1], [n+n]=[0], etc. As an aid in remembering which rotation is which, one can think of the four rotation states of the letter b: **b[0]b, b[1]d, b[2]p** and **b[3]q.** Note that b's 0, #1, #2 and #3 rotation states—b,d,p and q, respectively—form an alphabetical sequence.

For each of the three rotations, there are three classes of letters: letters that remain the same, letters that become different letters, and letters that become non-letters when rotated. There are thus nine different rotational classes of letters, of which each letter of the alphabet belongs to three. Since the three classes in which rotated letters become non-letters are of little interest, we will ignore them and consider only the other six classes. Here are the 59 rotatable letters comprising these classes:

Class 1a (#1, unchanged): A, H, I, M, O, T, U, V, W, X, Y; i, l, o, t, v, w, x
Class 1b (#1, transformed): b(d), d(b), p(q), q(p)
Class 2a (#2, unchanged): B, C, D, E, H, I, K, O, X; c, o, x
Class 2b (#2, transformed): M(W), W(M); b(p), d(q), p(b), q(d)
Class 3a (#3, unchanged): H, I, N, O, S, X, Z; o, s, x, z
Class 3b (#3, transformed): M(W), W(M); b(q), d(p), n(u), p(d), q(b), u(n)

(Note that the l.c. letter l is not included in classes 2a and 3a, as inversion changes it from an ascender to a descender.)

At the word and sentence levels of rotated writing, there is the additional complication of two or three different *modes* of rotation. For words, the two possible modes are rotation of the letters in place and rotation of the word as a whole; for sentences, the three possible modes are rotation of letters in place, rotation of words in place, and rotation of the sentence as a whole. Since four rotational states are possible in each mode, there are thus 4^2=16 rotation states available to words and 4^3=64 rotation states available to sentences. To denote these states, we need to augment our notational shorthand at the word and sentence levels. For word rotations, let us say that in the notation **[n,p]**, n denotes the number of the rotation, if any, applied to the individual letters of the word and p the number of the rotation, if any, applied to the word as a whole. Thus, for example, **WHO [0,3] OHM, WHO [1,3] MHO, WHO [2,3] OHW,** etc. For sentences, let us say that in the notation **[n, p, q]**, n denotes the number of the rotation, if any, applied to the individual letters, p the same for the individual words, and q the same for the sentence as a whole. Thus, for example, **WOE I WOOED [0,0,2] MOE I MOOED,** etc. (In practice, one would probably seldom encounter a sentence rotated in any other way than as a whole, but we may as well have a consistent notation.) Note that although the rotation of a word or sentence simultaneously rotates all smaller units within itself, the rotations of these smaller units are not separately denoted, since they do not occur as the result of a separate operation.

Verity or Variety?

At the sentence level of rotations, a question of esthetics arises. As Willard Espy and others have noted, **MOM SWIMS WOW** looks exactly the same when inverted by a [0,0,3] rotation; it is thus an example of a visually "pure" sentence rotation. But if we wish to be able to compose somewhat more elaborate and stylistically appealing sentence rotations, adorned with punctuation and whatnot, such as **MOM SWIMS—WOW!,** or **SWIM, SON? I'M ON OSMOSIS! NO SIN IN ININI, SONS, I SOW, SO—NO WINO SWIMS!,** we must be willing to compromise a bit in the matter of visual purity. Specifically, we will need to adopt the convention that in sentence rotations, punctuation and the location of word breaks are considered to be extraneous to the rotation—i.e., they are ignored. But is this really an acceptable compromise, given that in rotated writing visual form is, after all, paramount?

Word-Level Challenges

Fortunately, we need not confront that issue here, as the remainder of this article is concerned only with word-level rotations. These present no dearth of logological challenges. In *Language on Vacation* (Scribners, 1965), Dmitri Borgmann listed long words which might be formed from rotatable u.c. letters in #1 (HOMOTAXIA, ITIVIMIUT, MYOMOTOMY, HOITY-TOITY) and #2 (BECHECKED, CHECKBOOK, CHECKHOOK) rotations. (In the first instance, Borgmann utilized the letters-rotated-in-place mode of rotation, i.e., **MYOMOTOMY [1,0] MYOMOTOMY;** in the second, his mode of rotation might have been either [2,0] or [0,2].) Assuming that Borgmann did, in fact, find the longest words in those categories, many others remain for which no longest-word candidates have yet been named. Factors defining such categories include kinds of rotation, modes of rotation, letter case and whether the rotated word stays the same or is transformed into a different word. Given the multiplicity of possible combinations of these factors, there should be enough fillable categories here to keep the unruliest rotationist quietly occupied for a **MEEK [0,2] WEEK** or so.

Another basic word-level challenge is this: inasmuch as a rotatable letter leads a pointless, probably forlorn existence if there is not at least one rotatable word in which it can be used, it seems morally incumbent upon rotationists to try to identify at least one such word for each of the 59 rotatable letters. There being 16 rotation states available to words, these letters have varying

numbers of main chances to find compatible host words, but every n-rotatable letter has at least two, in the [n,0]- and [0,n]-rotation states. Shown below is a representative word list for the [0,n] case. My arbitrary rules for such lists are that no letter alone, or its plural or possessive, may be considered a "word" for this purpose, that abbreviations, initialisms and acronyms are unacceptable, and that proper nouns other than surnames are acceptable if documentable. With the exception of *zzz* (Random House), all of the words in this list are in Webster's Third:

Class 1: **YAW** (WAY), **MI**M (MIM), **OH** (HO), **TU**T (TUT), TA**V** (VAT), TA**X** (XAT);
bid (dib), **lit** (til), **wo**t (tow), o**xo** (oxo) … **q/p, v** ?
Class 2: **BOXED** (BOXED), **CHIK**EE (CHIKEE), **ME/WE**; **box/p**ox, **cod/coq**
Class 3: **HON** (NOH), **SIX** (XIS), **MOW** (MOW), **ZZZ** (ZZZ); **dos/sop**, **nu** (nu), o**xo** (oxo),
zzz (zzz) … **b/q** ?

As may be seen, this list falls five l.c. letters short of completion. Were initialisms and abbreviations allowed, it might easily be completed with **qv/vp** in class 1 and **bns/suq** in class 3. Alas, the supplies of l.c. letters in these classes appear insufficient to provide the five wallflower letters with any but such disallowed dictionary words. Proper nouns would seem to offer little hope, as, for a combination of reasons, it is impossible for [0,n]-rotatable l.c. words to have initial capitals. This means that any prospective proper noun would have to be an uncapitalized one, and how many proper nouns of *that* kind do we find in English, for heaven's sake?

Enter, sideways, crusty *oiliqo.*

An Odd Crab from Godthaab

In March of 1993, the stamp-issuing Danish dependency of Greenland (of Qaanaaq fame) released a set of three postage stamps depicting species of locally fished crabs. The 7.25-krone value featured a large crab Greenlanders call Saatuaq, "the flattened one." On the stamp, Saatuaq's Latin name was given, in small sans-serif type, as *Chionoecetes oiliqo*. These stamps were issued in sheet form. Five months later, the 7.25kr stamp was reissued, this time as part of an eight-stamp booklet pane. But the reissued stamps were slightly different from the originals; on them, Saatuaq's Latin moniker was given, not as *C. oiliqo,* but as *C. opilio* (see the illustration below). What was going on?

It transpired that *opilio* (Latin for "shepherd") was, in fact, Saatuaq's correct species name. Evidently, at some point in the preparation of the stamp, *"opilio,"* along with the rest of the lettering, was mirror-reversed (i.e., given a [0,1] rotation) for some reason and then, because all of its letters happened to be #1-reversible and because its [0,1] rotation, *"oiliqo,"* could apparently pass for a Latinism, was erroneously never re-reversed. After the sheet stamps had been printed, however, the error was noticed and rectified in time for the correct name to appear on the booklet stamps. Thus did salty Saatuaq acquire a government-conferred second species name, and thus did the Danish PFC Stamp Printing House inadvertently contribute to the solution of an obscure problem in logology. For with the arrival on the scene of **op**ilio/oili**qo** as a [0,1]-rotatable word pair, the number of unemployable letters in the [0,n]-rotation list was suddenly reduced from five to three.

Or was it? Given its humble origin as a typographical error, can "oiliqo" realistically aspire to any kind of lexical legitimacy? I believe that it can, for this reason: unlike most typos, which are typically transitory, "oiliqo" is now permanently established in one of our culture's specialized lexicons, the philatelic, as Greenland's "oiliqo" error. Every year, in annual stamp catalogs and other philatelic literature, "oiliqo" is published anew—and then, of course, there are the "oiliqo"

stamps themselves, which will be with us forever as collectibles. Thus, any who would dogmatically deny "oiliqo's" existence as a functional word must henceforth contend with abiding and recurrent physical evidence to the contrary.

And in any case, do logologists really wish to turn a cold shoulder to fate when fate seems to be trying so hard to be helpful? Consider the host of improbable circumstances that had to conspire to make the opilio/oiliqo word pair available to us as a solution to the **p/q** problem: (1) The two needed words had to be proper nouns, as all other possibilities had apparently been exhausted. (2) They had to be the one kind of proper noun that is normally not capitalized, the species name in Linnaean nomenclature. (3) All of the letters in the words had to happen to be #1-rotatable. (4) Among those letters had to be *p* and *q*. (5) It had to be the case that the new word was a [0,1] rotation of an existing word. (6) The words had to have been set in a sans-serif typeface. (7) The new word had to be sufficiently plausible to fool the printers, which could only happen if its ostensible language were unfamiliar to them, presumably a rare occurrence. (8) The words had to manifest in a conspicuous and durable setting; here, fate outdid itself, selecting, of all venues, the designs of postage stamps. (9) The words had to be noticed by someone who would later think of them in connection with the rotatable letters problem. That is quite a roster of lucky coincidences to ascribe to mere chance!

But then again, perhaps it was not fate that engineered these many coincidences, but only Titivillus, the busy demon responsible for typographical errors. After all, wouldn't Titivillus, by the very nature of his work, be a logologist of a sort? If so, perhaps it is the case that *every* typo embodies a logological nation of one kind or another…

Greenland's 1993 "oiliqo" (error) and "opilio" (corrected) crab stamps. (Illustration Copyright 1994 Linn's Stamp News, Sidney, Ohio USA. Reproduced with permission.)