

THE GUNPOWDERY BLACKSMITH

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As described in *Making the Alphabet Dance* (and earlier in the February 1977 *Word Ways*), two English words can use a maximum of 20 different letters without repeating at least one. This is accomplished by the GUNPOWDERY BLACKSMITH who is by now assured a place in logarithical history. This pair of words satisfies the strictest considerations of quality, each appearing as solidly written boldface entries in Webster's Third (W3). The following challenges naturally arise: do other such high-quality 20-letter examples exist? Can other 20-letter examples be found by loosening standards somewhat? How many 19-letter examples lurk in the wild? The 20-letter challenge has also arisen in *Word Ways* in the context of the generalized Jotto Problem (November 1996). Chuck Fendall submitted various 20-letter pairs, though regrettably none is W3-sanctioned.

For the purpose of this exercise, "high-quality" is defined according to the *Games Magazine* rules of acceptability, namely solidly written boldface entries in the main section of W3 not listed only as "Capitalized", "Usually Capitalized", abbreviations or symbols, and clearly implied inflected forms of these words. Comparative and superlative forms of adjectives are only acceptable if explicitly specified, but noun plurals and verb forms are acceptable if clearly implied by related words. Gerund plurals are not acceptable. This standard is used so that the results of the search can serve as building blocks for another old challenge, *Games Magazine's* July 1991 "Nots and Crosses" contest, which I will describe in a separate article. Near misses are also collected, defined as W3 entries and plausible inflected forms which don't meet the above criteria. The exercise of including other reference sources (W2, W3 addendum, OED, geographical and personal names references, etc.) and Borgmannesque coinages is left as a separate exercise.

A note on terminology: a word in which no letter is repeated has been called at various times an *isogram*, *solo isogram*, *non-pattern word* and perhaps most descriptively a *heterogram* (coined by Susan Thorpe). *Making the Alphabet Dance* seems pretty well set on *isogram*, so this term will be used here. No term has been proposed to refer to a pair of words which don't repeat a letter; *bisogram* seems as good as any.

The results of the search for big bisograms can be summarized as follows: no more high-quality 20s, a number of frustrating near misses, and a decent list of 19s were found. It should be noted that this search was done manually, and can no doubt be improved upon. Thus, I view these results merely as an appetizer, and await the efforts of those with

access to computerized lists of words. The current list of high-quality 20- and 19-letter bisograms, and high-quality 19s, follows. In cases where an S can be appended to either word in a pair, this is indicated by /S after the longer word.

HIGH QUALITY BISOGRAMS OF LENGTH 20 AND 19

20 (10,10)	blacksmith gunpowdery
19 (15,4)	dermatoglyphic/s funk
	dermatoglyphic/s bunk
	dermatoglyphic/s junk
	dermatoglyphic/s knob
19 (13,6)	thumbscrewing alkoxy
	thumbscrewing jalopy
19 (12,7)	backswordmen flighty
	zanthoxylums bricked
	zanthoxylums pricked
	carbethoxyl/s dumping
19 (11,8)	blameworthy duckpins
	blaspheming ductwork
	deutschmark bowingly
	fosteringly humpback
	oxywelding/s humpback
	furthcoming skewbald
	patchworked musingly
	patchworked jumbling
	patchworked fungibly
	patchworked fumingly
	patchworked fumbling
	playwrights uncombed
	providently buckwash
	zincography stumbled
19 (10,9)	backlights jurywomen
	blacksmith gunpowder
	campfights overbulky
	carbethoxy dumplings
	debatingly shuckworm
	dithyramb/s gowpenful
	fetchingly zubrowkas
	gunpowdery blackfish
	pterygodum blackfish
	hydroflaps bucketing
	overflying humpbacks
	toweringly humpbacks
	oxywelding humpbacks
	switchgear flunkydom
	throwbacks depluming
	throwbacks duplexing
	throwbacks jumpingly
	thumpingly backsword
	vetchworms daubingly

We are now joined by UNCOMBED PLAYWRIGHTS as well as GUNPOWDERY BLACKSMITHS. Note that THROWBACKS/JUMPINGLY doesn't use an E!

NEAR MISSES, LENGTH 20 AND 19 (near-miss words in italics)

20	backswordmen, <i>upflight</i> blacksmithy gunpowder broad jumps fetchingly campfights unworkedly ductworking blasphemy forjudgments pickably	inferred from upfly in W3 by analogy with "smithy" both in W3 (darn that spacè!) adverb form not in W3 by analogy with "lampworking" "forjudge" and "judgment" in W3; "pickable" in W3 "physick" archaic form of "physic" "bywalk" listed as a noun only gerund plural, not in W3 gerund plural, not in W3 adverb form not in W3 "waltz jumps" two words in W3
	<i>forjudgment physickal</i> furthcomings bywalked patchworked fumblings patchworked jumblings springbuck fathomingly waltz jumps defrocking	"forjudge" and "judgment" in W3 "forjudge" and "judgment" in W3 adverb form not in W3 "bumper jacks" two words in W3
19	<i>forjudgment blackish</i> <i>forjudgment physical</i> furthcomings bakedly bumper jacks dotingly	

The internal structure of long bisograms is interesting, as one must find long isograms which leave enough vowels to form suitably long companion words. Each vowel must do its part in picking up consonants. Components such as black, screw, wright, sword, thumb and glyph are promising building blocks. THUMBSCREWING is a rare (if not unique) 13-letter three-vowel isogram. However, only six-letter companion words could be found; similarly for BACKSWORDMEN, BEDCLOTHINGS, FURTHCOMINGS, JACKLIGHTERS and NIGHTWALKERS, which use twelve letters and three vowels. Among eleven-letter isograms which use only two vowels we find BLACKTHORNS. Given the remaining letters, can a nine-letter word be found? Many ten-letter isograms use only two vowels, perhaps most promising of which is VETCHWORMS, due to the uncommonness of its letters. Given the vowels AIUY to work with, can a longer companion than DAUBINGLY be discovered? The suffix -INGLY features prominently, mostly since it is quite easily recognized when manually seeking long words in a large list of alphabetized letters, hence the presence of FETCHINGLY, JUMPINGLY, DAUBINGLY, etc. Using one or more of the uncommon letters JQXZV also leads to promising beginnings, with words like ZANTHOXYLUMS, CARBETHOXYLS and OXYWELDING deserving special attention. However, as each uses four vowels, companions could not be found to form 20-letter pairs. Among the near misses, BROAD JUMPS/FETCHINGLY and WALTZ JUMPS/DEFROCKING both involve two-word W3 entries; only a space prevents a high-quality 20.

The large number of high-quality 19s makes it likely that at least one other high-quality 20-letter bisogram lurks unsuspectingly, waiting to be discovered. I invite additions to the list from interested readers.