# KNIGHT'S CHALLENGE ANSWERED

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Only one solution was received for the Five-Jog Knight puzzle contest posed in the November *Word Ways*. Submitted in mid-December, editor Jeremiah Farrell's solution managed to achieve a 20/20 Collegiate score, which is to say that every word in its 20-word word set is an entry in *Webster's New Collegiate Dictionary*. Such perfection had not been expected.

Readers may recall that the object of this puzzle was to find a word for each of the 20 node circles in the knight's network such that each letter of that word would be shared with one of the neighboring node-words to which it was connected by a knight's move. A further constraint was that each letter of the alphabet had to appear in the network at least twice and that no letter could appear in it more than four times. (Or to put it another way, solvers were given four complete alphabets, two of them upper-case and two lower-case; all 52 of the upper-case letters had to be used in the solution, as well as any 24 of the lower-case letters.) The solution containing the most words listed in the Collegiate was to be the winner.

Shown at left below is a proof-of-solvability solution by the author in which 17 of the 20 words are listed in the Collegiate, the exceptions being *feu, jynx* and *vac*. The 12 lower-case letters it uses twice are *a, e, h, i, l, n, o, r, s, t, u* and *y*. To its right is the editor's winning solution, in which, as mentioned, all 20 words are Collegiate entries. (*Xed* is the past tense of the verb "to x" [i.e., mark with an "x"], and is listed in boldface type under the word *X* in the Collegiate.) The 12 lower-case letters it uses twice are *a, b, e, g, i, n, o, r, s, t, u* and *y*.
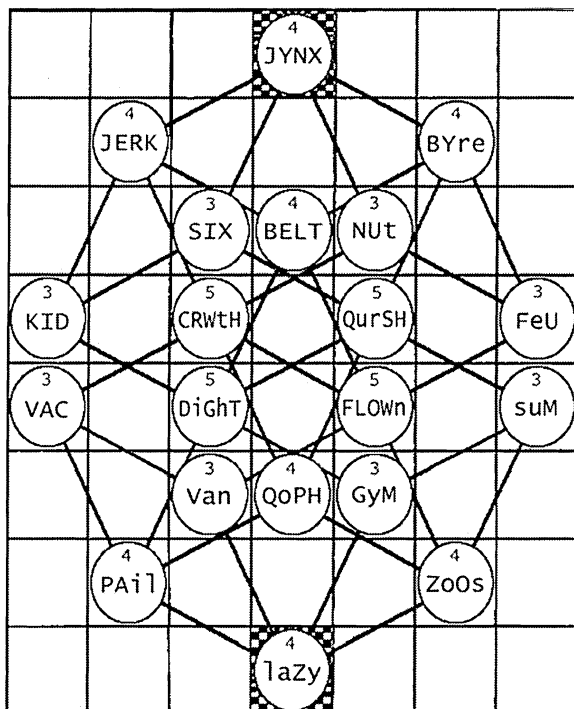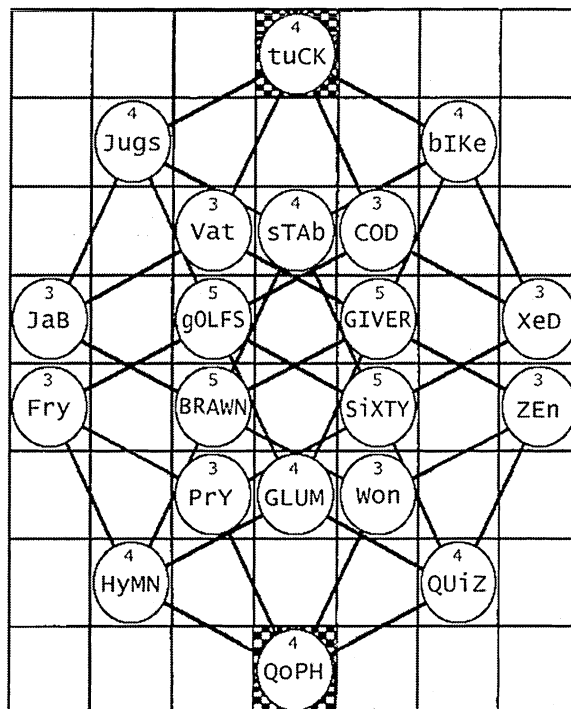
AUTHOR'S SOLUTION   WINNING SOLUTION

The reason for the Collegiate-score element of the contest, of course, was to encourage solvers to search for the commonest words to use in their solutions. The Collegiate was not necessarily the best dictionary that could be found to serve as the criterion of solution quality ("quality," in this context, being taken to mean the relative commonness of a solution's word set), but its ubiquity recommended it. An objectively better choice might have been Merriam-Webster's next-smaller current dictionary, a trade paperback entitled simply *The Merriam-Webster Dictionary*. This work, which is described as being "based on" the Collegiate, contains about 65,000 entries as compared to the Collegiate's 165,000. When scored by this dictionary, my solution loses an additional five words (*byre, crwth, dight, qoph* and *qursh*), whereas Jerry's solution surprises again by losing only *one* word (*qoph*). Thus, while the Collegiate quantifies the quality difference between the two solutions as 20 − 17 = 3, its smaller cousin makes it 19 − 12 = 7. Which of these numbers seems to better reflect the actual magnitude of the quality gap?

An interesting, if perhaps irrelevant, aspect of solutions to this puzzle has to do with their relative degrees of permutability. In the first solution above, for example, two of the words (*six* and *nut*) have Collegiate-listed anagrams (*xis* and *tun*), meaning that it could have been expressed as any one of four different word sets. The second solution, on the other hand, with its Collegiate-listed anagrams *bast/bats/stab/tabs, flogs/golfs* and *now/own/won,* could have been expressed in no fewer than 36 different word sets. And had the Collegiate, as some other dictionaries do, chosen *tav* rather than *taw* for the spelling of the Hebrew letter—thereby listing an anagram for *vat*—the number of different word sets that this solution could form would stand at 72. Is it purely coincidence, I wonder, that the solution with the commoner words is also the more protean of the two?

Although not interested in pursuing these puzzles to the Six-Jog Knight's level, I was curious to see what its network would look like and therefore constructed the following diagrams. They show the network formed by a composite of all the routes that connect the central squares of the end rows of a 9 x 11 chess-board in six knight's moves; grid lines are omitted for clarity. As a puzzle, the Six-Jog looks as though it might be solvable, depending on what, if any, restrictions were to be placed on the selection of the 184 letters needed to fill its 39 nodes.