LOOK BACK!

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In February and August 1996, I wrote two Word Ways articles, "Queen's-Move Graphing" and "Queen's-Move Graphing Revisited". There has been no subsequent exploration of this topic in Word Ways by a computer-literate generation of logologists.

A word is queen's-move graphable if one can place its different letters (no repeats) on an 8-by-8 chessboard (enlarged if necessary) and spell it out using queen's moves (straight lines horizontally, vertically or diagonally) from one letter to the next. For example, here are graphs of AURICULOCRANIAL, DIPLOSPONDYLISM and ANIMALIZATION:

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  C + + O       Y D          Z + A + T       E T Y
I R U +         + I            + L +       D M N R P
N A L         + L P S M      N + I + M       I A O
            N + + O            O
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Finding necessary and sufficient conditions for queen's-move graphability is a very difficult task. An obviously necessary condition is that no letters participate in more than 8 bigrams. SUPRADIAPHRAGMATICALLY fails, with A in 9 bigrams (R,D,I,P,G,M,T,C,L). A less-obvious necessary condition is that no pair of letters in a word share 6 or more other letters in their bigrams. Richard Sabey noted in the May 1996 Colloquy that ANIMALIZATION can be queen-graphed because I has bigrams IZ, TI, LI, NI and IM, and A has bigrams ZA, AT, AL, AN and MA, sharing the 5 letters Z, T, L, N and M.

Two further specialized conditions appear to be true: (1) a word of 5 different letters is queen-graphable if it contains no more than 8 of the 10 possible bigrams; (2) a word of 6 different letters is queen-graphable if it contains no more than 11 of the 15 possible bigrams. Can similar restrictions be formulated for 7 or more letters?

The shortest word that cannot be queen-graphed is the 10-letter INSCIENCES, and the longest that can is the 34-letter DIAMINOPROPYLTETRAMETHYLENEDIAMINE (in the Random House Unabridged). Amazingly, this word (see upper right) is king-graphable as well!

Only a few dozen Web 2 or Web 3 words are not queen-graphable. In 1996 Dan Tilque devised a computer program that determined if a given word could be queen-graphed. Can such a program be used to learn more about necessary and sufficient conditions for queen-graphability, experimenting with a wide variety of real or imaginary words? Can light be shed on the problem by analyzing king-graphability or rook-graphability? What about graphability on hexagonal or triangular pavements instead of chessboards?