NEW WORD RECREATIONS

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In the November issue, Jim Puder nicely extended Harold Jacob’s “Three Jog Knight” (WW Aug 2008) to a Five-Jog Knight puzzle. Puder and the editor solved the problem and its solution appears in this issue. I wish to extend their results and point out some new puzzles and games that can be performed with their words.

First, many graphs can be treated as maps of cities upon which one could ask for a route that visited every city exactly once and returned to the city it started from. This is called a Hamiltonian circuit after the Irish mathematician Sir William Rowan Hamilton, and sometimes is referred to as the “traveling salesman’s problem”. For the Five-Jog Knight graph there exists many such circuits but they are not so easy to find on the grid. In fact we prefer to make an even harder puzzle of it by writing the 20 node words BIKE, BRAWN, COD, FRY, GIVER, GLUM, GOLFS, HYMN, JAB, JUGS, PRY, QUIZ, QOPH, SIXTY, STAB, TUCK, VAT, WON, XED, and ZEN on cards. For misdirection we make all letters upper-case. Now try to arrange the cards, domino fashion, so that abutting cards have a letter in common. If you succeed in completing a circuit with your cards, you have solved the puzzle. One solution is given in Answers and Solutions. 150 years ago Hamilton had devised a puzzle on the corners of a dodecahedron that was the first such puzzle. It is reported that he earned $25 for it. I give below what is called a Schlegel diagram of the dodecahedron that illustrates Hamilton’s puzzle. The nodes are words formed from DISCOUNTABLE where each of the 12 letters is used exactly five times each. The edges are two-letter joins and the 12 pentagonal areas inherit the letter common to the five nodes that surround it (including the outside area’s E). The reader may refer to the article “A Bouquet for Gardner” in this issue for a solution that is a Hamiltonian circuit.
Another puzzle. Find 16 four-letter words to place in the circuit below so that each word has a letter in common with its neighbor. Try to use each of the 16 letters of OSCAR THUMPBINDLE exactly four times in your word set. My answer appears in Answers and Solutions.


Finally, I found in my files a sheet dated October 24, 1998 that illustrates another approach to this kind of graph problem. Place the 12 Chambers dictionary entries AD, AH, AT, DO, HD, HT, OH, PA, PD, PO, PT and TO on the nodes of the grid so that no two nodes connected by an edge have a letter in common (including the dashed edges). All letters are from the word HOTPAD.

![Diagram of the grid with numbers 1 through 12 and dashed lines connecting the nodes. Each node is labeled with a letter or a number. The letters are AD, AH, AT, DO, HD, HT, OH, PA, PD, PO, PT, and TO. There are dashed lines connecting some of the nodes.]
My answer will be given in the May issue. Meanwhile I note in the 1998 paper that this graph is Hamiltonian and in fact if any single node is removed along with its connecting edges the resulting graph is still Hamiltonian. Also if the 12 nodes are on discs and two people play alternately on the graph according to the keep away rules, the second person has a forced win!

I also point out the beautiful symmetry of this graph which I call “the misgraph of the cuboctohedron.” For instance, every node is on exactly two triangles (3-gons), two 4-gons, and?... much more later.

A POEM

MARTIN GARDNER
Norman, Oklahoma

This is an excerpt from Gardner’s 1969 book Never Make Fun Of A Turtle, My Son (Simon and Schuster, illustrated by John Alcorn).

**The Giggles**

A giggler gets the giggles
At every little thing —
A puppy dog that sneezes,
A cow that tries to sing.

She giggles at an elephant,
She giggles at a toad.
She giggles if a baby duck
Waddles down a road.

She giggles if the teacher asks
If two and two are four.
At lunch she giggles if she spills
Potatoes on the floor.

When Mother sat on Daddy’s hat
She giggled till she cried.
*I think she ate a feather that
Is tickling her inside!*