GRID

GURU

This Caltech alum relishes constructing crossword puzzles for many of the same reasons he appreciates computer science. Publication in *The New York Times* is a bonus.

by Judy Hill

Steve Ginzburg (BS '98) was only a few years post-Caltech when he caught the crossword bug. On a trip home to Santa Cruz to visit his parents, Ginzburg, who was working as a software engineer in Santa Barbara at the time, was intrigued by the puzzles his empty-nester parents tackled at breakfast.

It was not the challenge of solving the clues that held his attention, though. "I thought about it for a few minutes," he remembers, "and I realized, 'You know what, these are probably more interesting to create than they are to solve.'" With that, he grabbed a piece of graph paper and started make his own puzzle.

Humbled by the difficulty of the task, Ginzburg contacted "a very active, supportive community of crossword puzzle constructors" and found a couple of puzzle veterans who coached him by email. In 2006, he had his first puzzle published in *USA Today*. The following year, one of his puzzles was accepted by legendary puzzle editor Will Shortz and published in *The New York Times*, the gold standard for crosswords.

Other newspapers, including the *New York Sun* and the *Los Angeles Times*, have published his puzzles over the years, and though the puzzle pursuit has taken a back seat to parenthood and his work to improve safety-critical automobile software, Ginzburg is as much a crossword puzzle fan as ever. He attributes much of that interest to his training in computer science.

"Filling a grid with interlocking words is a very interesting problem from a computer science perspective," he says. "It comes from a class of problems where there is no guarantee of a perfect solution. And so you have to use heuristics; you have to apply intelligence to it to try to find a solution that you know isn't going to be optimal but is going to be pretty good." This, he says, is where the artistry of crossword puzzle creation meets the science of computer science.

For Ginzburg, the real pleasure in both solving and constructing a crossword puzzle lies in the theme, the clever idea or piece of word trickery that unites a puzzle's longest answers.

"It's really the most critical part of the puzzle, certainly if you want to create a marketable puzzle," says Ginzburg. "If it's a daily puzzle, you need to come up with three or four or five themed answers that are all consistent and fit together and make sense. For a Sunday puzzle, which is larger, it's more like six or seven."

Ginzburg remembers having particular fun working with a theme based on phrases that start with a pair of letters in consecutive alphabetical order that are an abbreviation. "So, I had ABPOSITIVE, which is a blood type. I had VWSCIROCCO, which is a car I once drove, and UVEXPOSURE. A commentator on a blog noted that he got as far as UVEXP but then figured with that odd letter lineup something had to be wrong in the crossword, until he worked out the theme."

Ginzburg keeps a file for theme ideas that he started to think about but never used. One such idea is based on a phrase that had suddenly come into the language: fake news. "I thought, 'OK, I've got to do something with that.' Will Shortz in particular has pioneered the idea of crossword puzzles being timely and interesting and topical." Working with the idea of "kind of nonsensical" phrases, Ginzburg jotted down the following:

Clue: Shocking discovery: tiny boats paddled by sprites!
Answer: FAYCANOES

Clue: Oliver Twist's so-called boss shows his delight— you won't believe why!
Answer: FAGINOOHS

Clue: Sign of the times, if not *The Times*
Answer: FAKENEWS

"I never managed to make this into a puzzle," he notes ruefully. "I just never got the theme to work quite right. I couldn't come up with enough words or phrases that were amusing enough or the right length."

Once the theme is set, the next challenge is to create the grid and fill it with words that are reasonably well known. "Many people don't realize this," says Ginzburg, "but the difficulty in the crossword puzzle comes not from the words being obscure but from the clues being clever. That's the difference between a Monday puzzle and a Saturday puzzle [the most difficult of the week]."

Prior to the Will Shortz era, he notes, crosswords were filled with arcane words and "all sorts of crazy things that nobody had ever heard of," but now the entire industry has gone in the direction of making the puzzles more accessible, putting the burden on making the clues, the last part of the process, trickier to add a degree of difficulty.

"There's a whole art to clue writing," says Ginzburg, and, particularly for common three-letter words, it can be challenging. Ginzburg is especially proud of one clue he came up with for the word AWL ("Spiked punch?") that even surprised his editor.

Left: Cyber security analyst Steve Ginzburg (BS '98) moonlights as a cruciverbalist.

Alums Across the Board, by Steve Ginzburg

ACROSS

1 Regina Dugan, PhD '93, former director of ___
6 Small part in a large machine
9 Org. defending freedoms
13 Like Chichen Itza
14 Start of "Deck the Halls" refrain
15 Defeat soundly
16 Spinach alternative
17 Some TVs
18 Hawkeye portrayer
19 Greet like a junkyard dog
21 France Córdova, PhD '79, NSF director and former president of ___
23 Michael Jackson hit featuring an Eddie Van Halen guitar solo
25 Order's partner
26 Steingrímur Hermannsson, MA '52, former prime minister of ___
29 About two and a half acres
33 Mare's hairs
34 Bridge combo
36 Stimpy's pal
37 Picnic spoiler
38 Harrison Schmitt, BS '57, astronaut and former ___
39 It comes from the heart? (abbr.)
40 Old orbiter
41 Ordained one
42 *Rowan & Martin's Laugh-In* comedian Johnson
43 It keeps you going
45 Sabeer Bhatia, BS '91, co-founder of ___
47 ___ -Man
48 Rain forest vines
50 Benjamin Rosen, BS '54, former chairman of the board for ___
53 Lost sleep (over)
56 ___ Prize (mathematics honor)
57 Coffee holders
59 Lackluster
61 All's counterpart
62 "Pick me! Pick me!"
63 ___ Walk
64 Annual Vietnamese holidays
65 "-com" preceder
66 Ray Feeney, BS '75, ___ winner for advancing the technology in his field
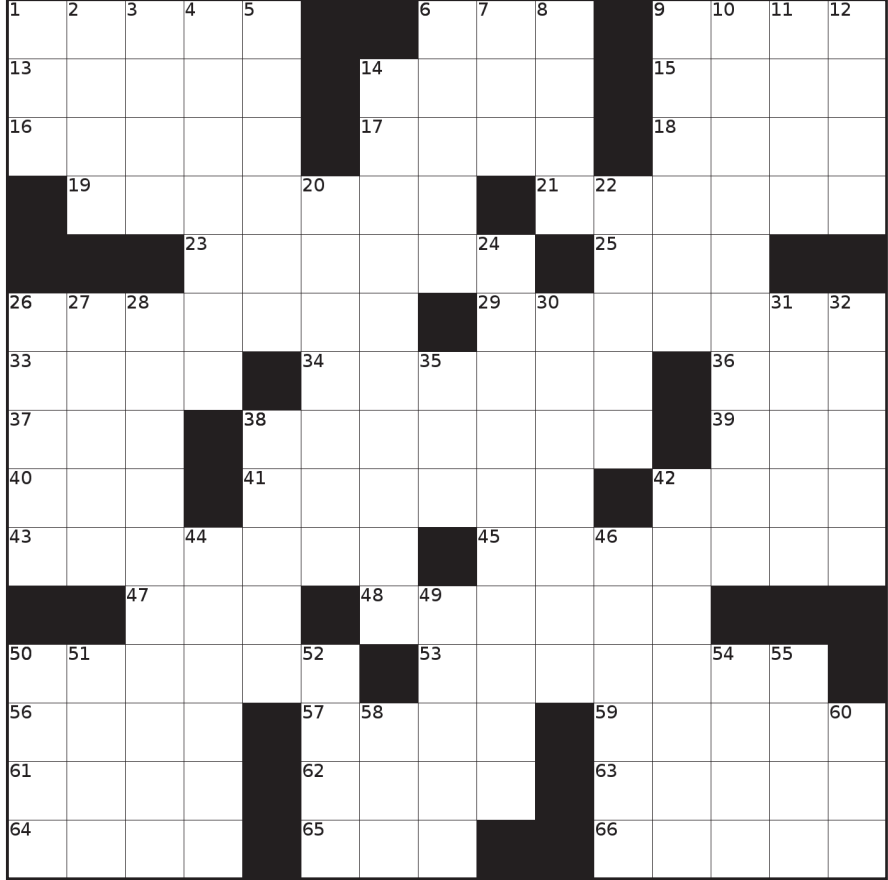
DOWN

1 Run-___
2 Contented sighs
3 Clancy hero
4 Teaching story
5 Tenor Bocelli
6 Some low-water plants
7 Out-of-date
8 Sound of surprise
9 Landing place of Noah's Ark
10 It ended around 1990
11 Big Island bash
12 ___ Reader: alternative media digest
14 "No way, no how!"
20 Camper's light
22 Bad gut feeling?
24 "What a mean thing to say!"
26 Islamic leaders
27 "Enough!"
28 Sting victim's court defense, perhaps
30 Transition area between plant communities
31 Prefix with linear
32 Actress Georgia of *Everybody Loves Raymond*
35 Aye's opposite (Scottish)
38 Shining light in Virgo
42 Dutch beers
44 Syrup sources
46 Kind of artist or parlor
49 Otherwise
50 Is incapable of
51 Double-reed instrument
52 Part of Q.E.D.
54 *Iliad* or *Odyssey*
55 Star of the opera
58 It sometimes represents density
60 Article from Germany?

Though most crossword constructors today use grid-filling software, Ginzburg insists it does not make creating a crossword less challenging. "Grid-filling software will tell you, first of all, if your grid is fillable. It will also help you figure out possibilities, like, 'Here are half a dozen different words that could fit in this slot.'" Still, he says, even with the software, there have been times when he has had 90 percent of the puzzle filled but then found himself backed into a corner. He says, "I have to use this really awful word up in the northeast corner in order to finish it. So, do I put that in there and hope the editor lets me get away with it, or do I come up with a clever clue, or do I unwind three quarters of the puzzle and start over and pursue a different direction?"

This, Ginzburg says, is where heuristics play a role in filling the grid. "A computer program is not going to give you heuristics. There has to be human intelligence applied to it to try to come up with the best possible grid. If not, an experienced editor will look at it and say, 'You know what? This has garbage entries.'"

An example of a "garbage entry" might be something like the word OREO, which, as any cruciverbalist (or crossword puzzle expert) will lament, pops up frequently as an answer. Why is that? There are certain combinations of letters, says Ginzburg, that are "just really handy" for filling a grid. "Anything that involves low-Scrabble-score letters, lots of vowels, or odd abbreviations."

Most words in the English language, he elaborates, alternate consonants and vowels. "So, if you ignore consonant sounds that are made up with two letters, like CK, and you just think about single-letter sounds, in order to fill a square, you have to alternate words that start with a consonant or a vowel. So, in a crossword puzzle, you're going to find more words that start with vowels than you would in ordinary text, and those words are going to be used more often. And that's how you end up with words like OREO and ARIA being overused."

The number of venues for selling crossword puzzles has diminished over the years, says Ginzburg, partly because fewer people read newspapers. And although he has less time to devote to it, solving puzzles will always be a favorite pursuit for Ginzburg: "I enjoy it more now that I've had the chance to create a lot of puzzles and because I appreciate more the artistry that goes into them."

As father of a 7-year-old and a 5-year-old, Ginzburg also gets a kick from hearing them start to make puns and experiment with wordplay. "It's like, 'Yes! They picked up the gene!'" [C]

In Memoriam

Walter Munk (BS '39, MS '40), 1917–2019

Alumnus Walter Munk, often called the "Einstein of oceanography," passed away on February 8. He was 101 years old.

Munk's early research on quantitative prediction of surf conditions was instrumental in ensuring the success of Allied amphibious landings during World War II. As a professor of geophysics at the Scripps Institution of Oceanography at UC San Diego, in La Jolla, he pioneered the use of sound waves for studying the ocean's structure, demystified the phenomenon of tidal locking, and led a global study of sea temperature that demonstrated conclusively the reality of climate change.

Possessed of a gift for translating observations of nature into profound quantitative descriptions, Munk laid the foundations of modern physical oceanography. A maverick who championed brave, revolutionary ideas, Munk was the first to understand the influence of tidal forces on the rotation of planets, was the first to use power spectra to describe waves, and was one of the first scuba divers on an oceanographic expedition.

"Walter was a legend in the field. I can hardly get through a couple lectures in my introduction to oceanography course without mentioning one of his major contributions," says fellow oceanographer Andrew Thompson, professor of environmental science and engineering at Caltech, who earned his PhD at Scripps. "It was a privilege to meet and talk with Walter as a graduate student and to see, firsthand, his love of science."

Even decades after his official retirement, Munk remained involved in research and scientific advisory efforts. He published his last peer-reviewed paper in 2015 at age 98 and, in that same year, participated in the Vatican City conferences on climate change attended by Pope Francis. He held the Secretary of the Navy/Chief of Naval Operations Oceanography Chair at Scripps until his death.