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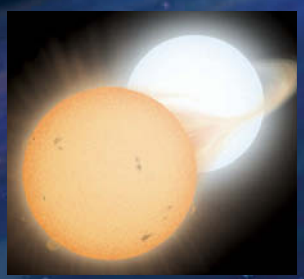

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Houston, we have a problem

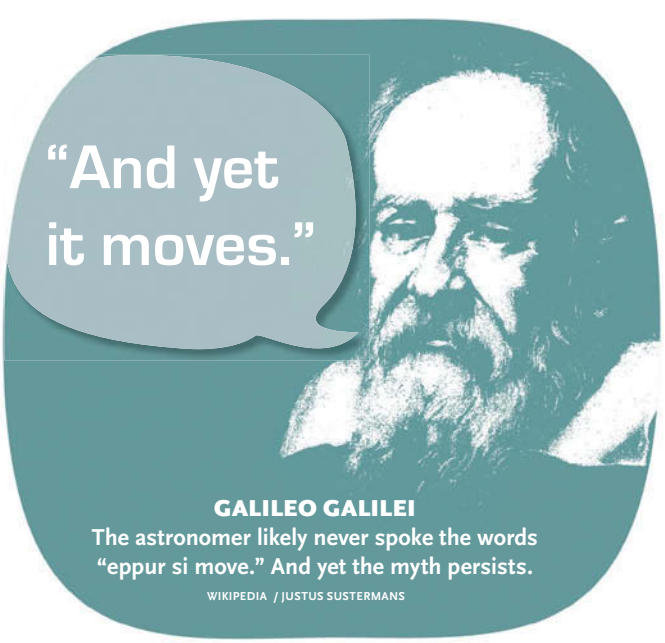
Dave English

Sometimes the most famous words are those never spoken.

A FEW WORDS can record profound ideas or memorable moments in history. Quotes such as, "Houston, we have a problem" or Carl Sagan's "billions and billions" resonate in our collective memory. But it turns out that our memory isn't always right. Some of history's most well known lines are misremembered, and quotations about astronomy are no exception. From Galileo to the Apollo missions, from *Star Trek* to *Cosmos*, I'll try to set the record straight on some of astronomy's most popular misquotes.

Eppur Si Move

One famously apocryphal story centers on Galileo Galilei, who recanted his heretical heliocentric theory before the inquisition in 1633. In one version, Galileo rises from his knees and mutters under his breath, "... and yet it moves." In Italian, it would have sounded like poetry: *eppur si move*. But there is no definitive evidence that Galileo uttered those dangerous words. The earliest biography of Galileo, written by his disciple Vincenzo Viviani, never



GALILEO GALILEI
The astronomer likely never spoke the words "eppur si move." And yet the myth persists.
WIKIPEDIA / JUSTUS SUSTERMANS

mentions the phrase. Although the phrase appears in an approximately contemporary painting showing Galileo, it does not appear in print until over a century later. Only in 1757 did Giuseppe Baretti write in *The Italian Library*, "The moment he was set at liberty, he looked up at the sky and down to ground, and, stamping with his foot, in a contemplative mood, said, *Eppur si move*; that is, *still it moves*, meaning the earth." The story sounds perfect, restoring dignity to a battered old man, but Paolo Galluzzi, the director of the Galileo Museum in Florence, recently dismissed the story as a myth. And yet it persists.

Second Star to the Right...

If you think the source for the phrase "second star to the right, and straight on till morning" is the magical character Peter Pan, you are correct. "That, Peter had told Wendy, was the way to the Neverland; but even birds, carrying maps and consulting them at windy corners, could not have sighted it with these instructions. Peter, you see, just said anything that came into his head."

But when James M. Barrie's *Peter Pan* debuted on the London stage in 1904, he said only, "second to the right, and straight on till morning" — with no mention of astronomical objects. The boy says the same line in the novel, published seven years after the play.

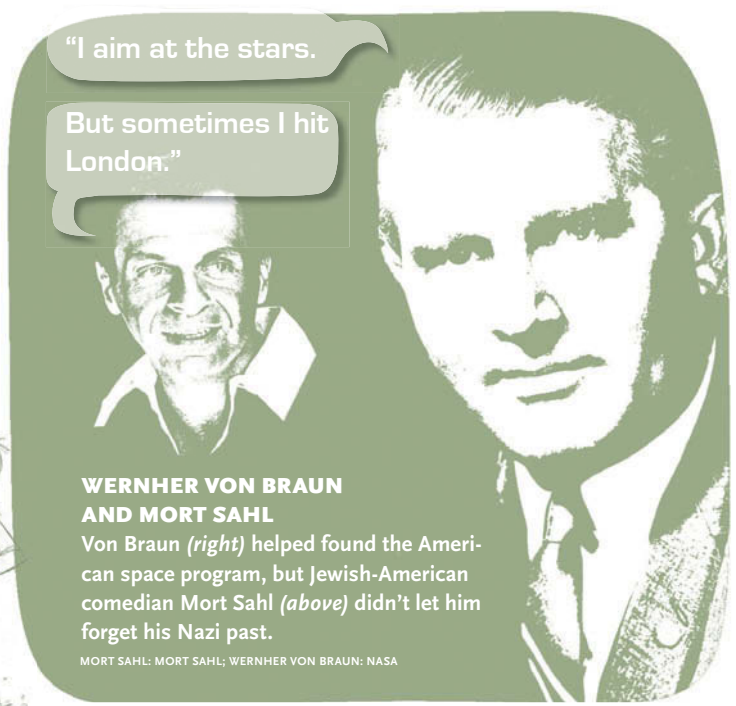
The Walt Disney film added the "star" in 1953. The quote, or parts of it, have since popped up in many places, including the title of a biography of aviatrix Beryl Markham, a Blues Traveler album, and the 1991 movie *Star Trek VI: The Undiscovered Country*. It's there that Chekov asks "Course heading, Captain?" James T. Kirk replies, "Second star to the right, and straight on till morning." Like Peter Pan, the phrase now flies without its shadow.

Earth is the Cradle of Humanity...

Konstantin E. Tsiolkovsky, the Russian astronautics pioneer who predicted human space exploration in both science fiction and engineering papers, wrote in a 1911 letter, "Планета есть колыбель разума, но нельзя вечно жить в колыбели." The phrase is almost always incorrectly translated as, "Earth is the cradle of humanity, but one cannot live in a cradle forever." A more accurate rendering would read, "A planet is the cradle of mind, but one cannot live in a cradle forever." The latter translation better illustrates the breadth and universality of Tsiolkovsky's thinking — though he worked largely alone, he considered himself a citizen of the universe.

I Aim at the Stars...

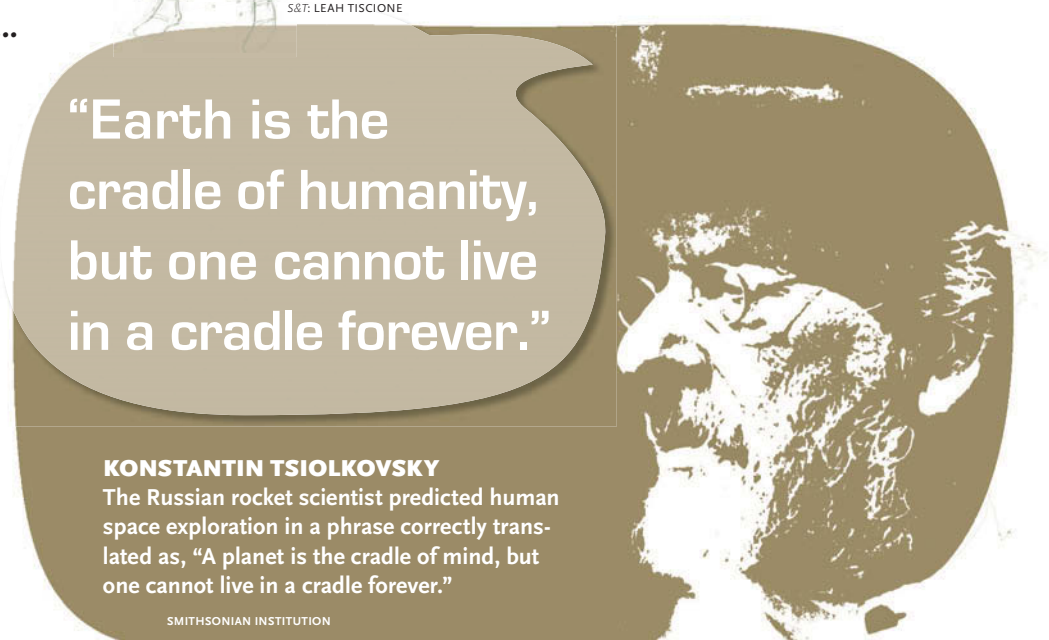
"I aim at the stars. But sometimes I hit London." This line is sometimes incorrectly attributed to Wernher von Braun, the principal designer of the Saturn V rocket that launched the Apollo missions. The first part — "I aim at the stars" — was the U.S. title of a 1960 biographical film about the life of von Braun. But it was Jewish-American comedian Mort Sahl who coined the movie's subtitle, a stinging reference to von Braun's World War II work on the V-2 rocket for Nazi Germany.



WERNHER VON BRAUN AND MORT SAHL
Von Braun *(right)* helped found the American space program, but Jewish-American comedian Mort Sahl *(above)* didn't let him forget his Nazi past.

MORT SAHL: MORT SAHL; WERNHER VON BRAUN: NASA

S&T: LEAH TISCIONE



KONSTANTIN TSIOLKOVSKY
The Russian rocket scientist predicted human space exploration in a phrase correctly translated as, "A planet is the cradle of mind, but one cannot live in a cradle forever."

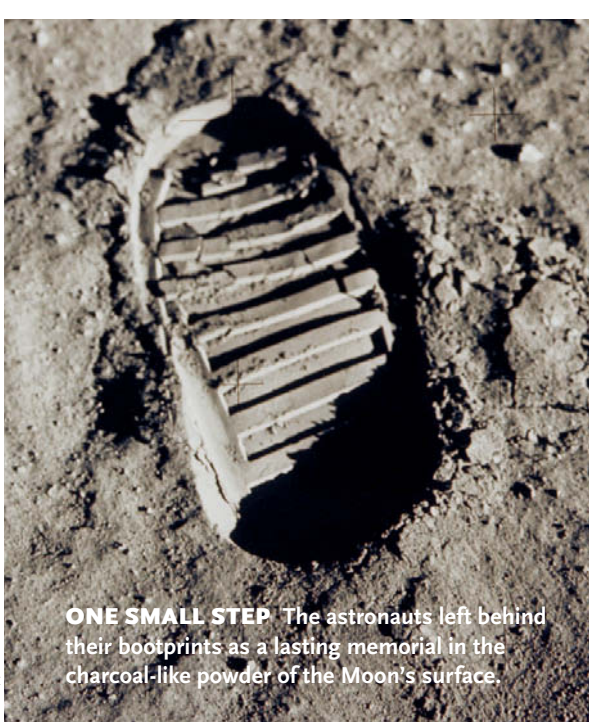
SMITHSONIAN INSTITUTION

That's One Small Step for [a] Man...

On July 20, 1969, at 9:56 p.m. local Houston time, Neil Armstrong stepped off the *Eagle* lunar module and onto the powdery rock of the Moon's Mare Tranquillitatis. He was the first human to walk on another heavenly body. A record-breaking audience of some 600 million people listened as Armstrong spoke slowly and with solemnity the most famous words ever uttered in space: "That's one small step for a man; one giant leap for mankind."

Or at least that's what he meant to say. One particularly short word became surprisingly controversial. The day after the Moon landing, *The New York Times* reported the line several times without the article "a," including on the front page and as the "Quotation of the Day." But Armstrong didn't realize his "a" was not heard until he returned to Earth. In the 1970 book *First On The Moon* (sold as the "exclusive and official account . . . as seen by the men who experienced it"), the quote includes the article, with a footnote explaining, "Tape recorders are fallible." Indeed, lunar surface communications were voice-activated and sometimes subject to interference. *The New York Times* ran a short column about the "a" 11 days after the Moon landing on page 20:

> One small but important word was omitted in the official version of the historic utterance he made when he stepped on the moon 11 days ago. . . . The "a" apparently went unheard and unrecorded in the transmission because of static, a spokesman for the Manned Spacecraft Center in Houston said in a telephone interview. Whatever the reason, inserting the omitted article makes a slight but significant change in the meaning of Mr. Armstrong's words.



ONE SMALL STEP The astronauts left behind their bootprints as a lasting memorial in the charcoal-like powder of the Moon's surface.

NASA (3)

But according to *Chariots for Apollo*, a 1986 book about the making of the lunar module, Armstrong realized his mistake when the builders of the lunar module presented him with a plaque inscribed with 11, not 12, famous words. Upon hearing Armstrong's protest, they listened together to the commemorative MGM 45-rpm record, and the "a" was nowhere to be found. Armstrong reportedly sighed, "Damn, I really did it. I blew the first words on the Moon, didn't I?"

If he didn't say it, no one would blame him. Armstrong was an amazing test pilot and a highly skilled aerospace engineer who had been awake many hours by the time of the moonwalk. He was making history on live TV in the ultimate dangerous environment. He was not an actor used to reciting lines. Armstrong told journalists 30 years after the Moon landing, "The 'a' was intended. I thought I said it. I can't hear it when I listen on the radio reception here on Earth, so I'll be happy if you just put it in parentheses."

That would have been the end of the story, but the debate took another turn when *The Times* of London reported on October 2, 2006, that an Australian computer expert had rediscovered the missing article using high-tech audio analysis. Peter Shann Ford ran the NASA recording through sound-editing software and "clearly picked up an acoustic wave from the word 'a,' finding that Mr. Armstrong spoke it at a rate of 35 milliseconds — ten times too fast for it to be audible." Neil Armstrong issued a statement saying "I find the technology interesting and useful. I also find his conclusion persuasive." But other audio experts have disputed this analysis and it has not

"That's one small step for a man, one giant leap for mankind."

NEIL ARMSTRONG
The first man on the Moon grins with giddy excitement after returning to the *Eagle* from the lunar surface, where he spoke his famous words.

been published in a peer-reviewed scientific journal.

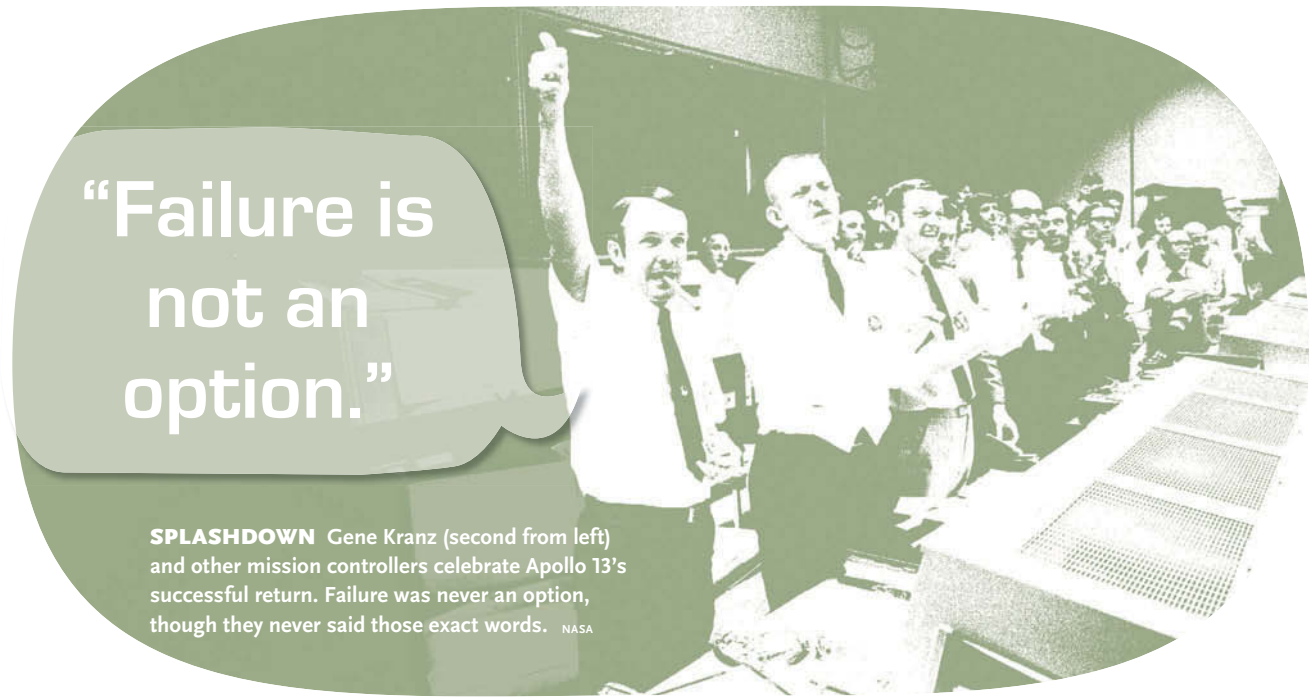
What do you think? You can listen to the recording online (**www.skypub.com/misquotes**) to refresh your memory. I think he said the "a," but the physical exertion, lack of sleep, and importance of the moment combined to rob Armstrong of his normally clear speaking voice. The way he naturally says the phrase makes the "a" soft, which was demonstrated on TV when the late political commentator Tim Russert politely ambushed Armstrong to repeat the phrase 30 years after Apollo 11. Even on that clean, professional recording, the "a," if it's there, is just not distinct. So [a] debate continues. And anytime the quote is published without Armstrong's parentheses, we miss a bit of history.

Houston, We Have a Problem

Another mangled quotation from the Apollo era has perfectly clear tape recordings, yet it's still repeated erroneously: "Houston, we have a problem." The Apollo 13 crew never said that phrase. At Mission Elapsed Time 55:55:20 (9:07 p.m. local Houston time) on April 13, 1970, Apollo 13 command module pilot John "Jack" Swigert, Jr. heard a large bang and felt a vibration when the No. 2 oxygen tank exploded. He radioed, "Okay, Houston, we've had a problem here." Past tense. Had a problem. Jack Lousma, the on-duty Houston capsule communicator, quite reasonably replied, "This is Houston. Say again, please." To which mission commander James "Jim" Lovell answered, "Er, Houston, we've had a problem. [pause] We've had a main B bus undervolt." Past tense again.

On the recordings it's clear, yet, as of late May, a Google search for the incorrect "Houston, we have a problem" (in quotes) yields over 1.37 million results, compared to only 177,000 results for the correct version. It certainly doesn't help that the 1995 movie *Apollo 13* uses the present-tense line, though the movie didn't invent it. Director Ron Howard aimed for a relatively accurate film, but he wasn't afraid to take artistic license. According to some sources, he chose the present tense version of the quote to convey the immediacy of the astronauts' situation.

MISSION CONTROL
"Okay Houston, we've had a problem here." Jack Swigert, Jr.'s words were the beginning of four harrowing days for Apollo 13's crew, and also for the flight controllers and support personnel on the ground.



SPLASHDOWN Gene Kranz (second from left) and other mission controllers celebrate Apollo 13's successful return. Failure was never an option, though they never said those exact words. NASA

Failure Is Not an Option

The Apollo 13 movie is also responsible for another misquote: "Failure is not an option." There is no evidence that legendary Flight Director Gene Kranz ever said that line before the movie was released. The words were later used as the title of his 2000 book *Failure Is Not an Option: Mission Control from Mercury to Apollo 13 and Beyond*, where he wrote that this was "a creed that we all lived by . . . Failure does not exist in the lexicon of a flight controller. The universal characteristic of a controller is that he will never give up until he has an answer or another option." Kranz used the phrase several other times in the book, but never directly claims it was his or that it was ever articulated as it's now known.

So how did actor Ed Harris end up saying it in the film? It turns out that the scriptwriters, Al Reinert and William Broyles, Jr., invented the line to quickly condense and capture the overall culture of mission control. They interviewed Jerry Bostick, the Flight Dynamics Officer for Apollo 13, about the atmosphere in mission control. He told them, "When bad things happened, we just calmly laid out all the options, and failure was not one of them. We never panicked, and we never gave up on finding a solution." Months after the interview, Bostick learned that as soon as the scriptwriters got in their car, Broyles yelled, "That's it! That's the tag line for the whole movie, 'Failure is not an option.' Now we just have to figure out who to have say it."

Listen to APOLLO AUDIO RECORDINGS

Listen to the original NASA recordings from Apollo 11, 12, and 13 and hear what the astronauts really said at www.skypub.com/misquotes.

Beam Me Up, Scotty

A celebrated TV series from the 1960s generated another space-related misquote: "Beam me up, Scotty." The phrase is commonly attributed to *Star Trek*'s Captain Kirk, played by William Shatner, who is presumably asking chief engineer Montgomery "Scotty" Scott for teleportation back to the starship *Enterprise*. But the phrase was never uttered exactly as it is now quoted, even though it can be found everywhere from bumper stickers to T-shirts. Indeed, it's seemingly everywhere except for a single Star Trek screenplay. In the original *Star Trek* TV series "The Gamesters of Triskelion" and "The Savage," Captain Kirk did say "Scotty, beam us up," and other times he said "*Enterprise*, beam us up." In the self-referential movie *Star Trek IV: The Voyage Home*, we come closest with "Scotty,

beam me up." The only place the exact phrase is ever spoken is in Shatner's audio adaptation of his novel *Star Trek: The Ashes of Eden*.

Billions and Billions

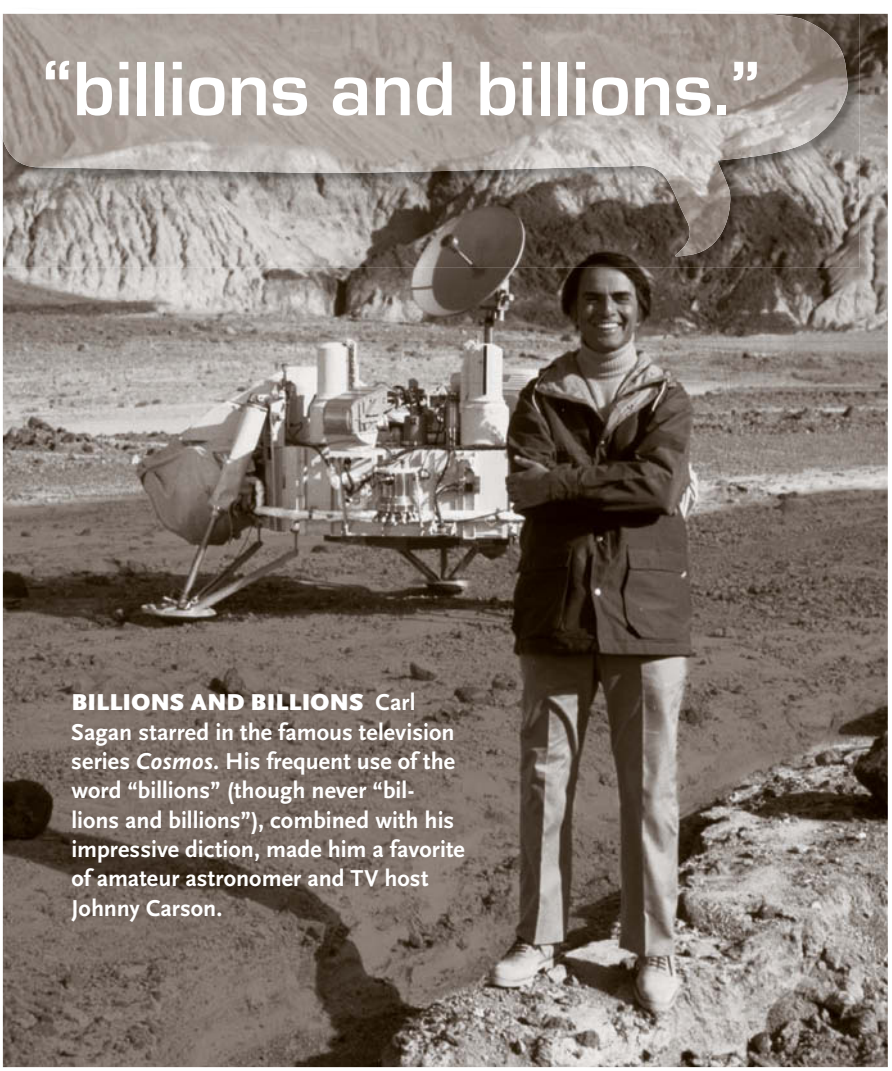
That's not the only famous line missing from hours and hours of videotape. Consider the final entry in this collection of misquotes: astronomer Carl Sagan's "billions and billions." In his posthumous 1998 book *Billions & Billions: Thoughts on Life and Death at the Brink of the Millennium*, Sagan wrote:

> I never said it. Honest. Oh, I said there are maybe 100 billion galaxies and 10 billion trillion stars. It's hard to talk about the *Cosmos* without using big numbers. I said "billion" many times on the *Cosmos* television series, which was seen by a great many people. But I never said "billions and billions." For one thing, it's too imprecise. How many billions are "billions and billions"? A few billion? Twenty billion? A hundred billion? "Billions and billions" is pretty vague. When we reconfigured and updated the series, I checked — and sure enough, I never said it.

So where did it come from? The answer is found in a comedy skit. Johnny Carson, an amateur astronomer who hosted Sagan almost 30 times on *The Tonight Show*, used the line whenever he impersonated Sagan. "He'd dress up in a corduroy jacket, a turtleneck sweater, and something like a mop for a wig," Sagan said. "Astonishingly, 'billions and billions' stuck. People liked the sound of it." Carson's phrase captured both the vastness of the cosmos and the essence of Sagan's vocal delivery. Although some people thought he emphasized "b" because he had a quirky accent or speech peculiarity, Sagan had carefully considered the problem of verbally differentiating between millions and billions. He felt the alternative — saying "that's billions with a b" — was too cumbersome for popular TV.

The Sagan case illustrates why we often prefer misquotes to the real thing. Johnny Carson's impression of "billions and billions" quickly distilled Sagan's style in an instantly recognizable way. Similarly, good caricatures appear to capture the essence of a person or idea, even though a closer look shows that the simple image distorts reality. A caricature can be more recognizable than a photograph because human brains are better at remembering distinctive features rather than small or fleeting differences. So it is with quotations, astronomy-related or otherwise, with some becoming distorted along the lines of an easy-to-remember caricature. Perhaps Sagan would have appreciated that "his" quote illustrates the curious nature of human perception.

If you've found other astronomy quotes that have been mangled or mashed, send them to **dave@daveenglish.com**. It's interesting to see how history is remembered, but it's also worthwhile to preserve the original lines. I don't know what the next great astronomical quotation will be, but let's hope with modern technology it will be recorded clearly! ✦



BILLIONS AND BILLIONS Carl Sagan starred in the famous television series *Cosmos*. His frequent use of the word "billions" (though never "billions and billions"), combined with his impressive diction, made him a favorite of amateur astronomer and TV host Johnny Carson.

BILL RAY / DRUYAN-SAGAN ASSOCIATES

Dave English watches the night sky from his home in Phoenix, Arizona. Visit his website ***www.SpaceQuotations.com***.