MISCELLANY

ETYMOLOGY OF THE COMPUTER *BUG:* HISTORY AND FOLKLORE

ETYMOLOGICAL FOLKLORE—I use *folklore* here in the sense of 'popular fantasy or belief'—is remarkably persistent. Neither lack of documentation, lack of plausibility, nor even outright disproof seems to pose much of an obstacle to the career of a colorful word-story. The term *hooker* 'prostitute', for example, is frequently derived from the name of a Civil War general. The fact that the *Supplement to the Oxford English Dictionary* records the use of *hooker* in this sense as early as 1845, long before General Hooker came on the scene, has had little impact on the popularity of this tale. It is unlikely ever to die as long as would-be etymologists ignore the existence of historical dictionaries.

A spurious account of the origin of the computer terms *bug* 'defect in hardware or software' and *debug* 'to eliminate such defects' is rapidly becoming the most popular item of etymological folklore of our time. The legend derives the terms from an actual moth found inside an early computer by the pioneer computer scientist Grace Murray Hopper. A typical recital runs as follows:

> One day in the 1940s, Harvard's famed Mark I—the precursor of today's computers—failed. When the Harvard scientists looked inside, they found a moth that had lodged in the Mark I's circuits. They removed the moth with a pair of tweezers, and from then on, whenever there was a problem with the Mark I, the scientists said they were looking for bugs. The term has stuck through the years. [*Dun's Business Month,* Feb. 1983: 125]

In some versions, the moth is said to have inspired the scientists to speak from then on of *debugging* the computer, with *bug* originating as a later back-formation from *debug.*

This moth myth has been popularized most widely by Jack B. Rochester and John Grantz's book, *The Naked Computer* (1983), but it has been repeated in many other publications as well. A search on the Nexis database of periodical articles turns up additional versions in the *New York Times* (19 Feb. 1984 and 3 Mar. 1985), *Time* (16 Apr. 1984), *Byte* (Jan. 1984), *Newsweek* (9 May 1983), and several wire service stories. I have also found the story in T. R. Reid, *The Chip* (1984); Joseph C. Giarratano, *Foundations of Computer Technology* (1982); Carin E. Horn and James L. Poirot, *Computer Literacy* (1981); and an advertisement for AT&T (*New York Times Magazine,* 8 Dec. 1985).

I must note that there does appear to have been a moth found in the Mark II (not the Mark I) by Grace Hopper and her colleagues at Har-

vard. It is preserved at the Naval Museum in Dahlgren, Virginia, taped to Hopper's log of 9 September 1945. However, the claim that computer defects are called *bugs* BECAUSE the moth was found is easily disproved. The *OED Supplement* records sense (4b) of the noun *bug* ("a defect or fault in a machine, plan, or the like") as early as 1889. In that year the *Pall Mall Gazette* reported (11 Mar.: 1) that "Mr. Edison . . . had been up the two previous nights discovering a 'bug' in his phonograph—an expression for solving a difficulty, and implying that some imaginary insect has secreted itself inside and is causing all the trouble."

An even earlier citation has been discovered by John Lord, who published his finding in a communication to *Byte* (July 1984: 32). Lord pointed out that, in a letter (of 18 Nov. 1878) to Theodore Puskas, Edison had written:

> It has been just so in all my inventions. The first step is an intuition—and comes with a burst, *then* difficulties arise. This thing gives out and then that—"Bugs"—as such little faults and difficulties are called—show themselves and months of anxious watching, study and labor are requisite before commercial success—or failure—is certainly reached. [Matthew Josephson, *Edison* (New York: McGraw-Hill, 1959), 198]

It is plain from citations in the *OED Supplement* and the *Dictionary of Americanisms* and the 1878 Edison quotation that, moth notwithstanding, the computer term *bug* was merely a specialized application of a general engineering term dating from the 1800s. This meaning was common enough by 1934 to be recognized in *Webster's New International Dictionary:* "bug, n. . . . 3. A defect in apparatus or its operation . . . *Slang, U.S.*" Hopper and her colleagues must have thought the discovery of the moth remarkable because mechanical defects were ALREADY called *bugs*. Her 9 Sept. 1945 log entry, which reads, "First actual case of bug being found," makes this quite clear. Even the verb *debug* must have predated Mark II, since the *Supplement* cites a 1945 usage in the *Journal of the Royal Aeronautical Society* which was probably preceded by several years of oral use in engineering slang.

I observe with regret that the spurious etymology is being promoted, not only by the mass media and popular writers on computers, but also by a scholarly journal that should know better. The *Annals of the History of Computing* proudly printed "Grace Murray Hopper's famous 'bug' story" in its July 1981 issue ("The First Bug," 285–86). I then contributed a rebuttal which was published in Apr. 1984 (" 'The First Bug' Examined,' 164), but editing by the journal obscured my point and protected the cherished Hopper story. A subsequent article by one of the editors (Henry S. Tropp, "Whence the 'Bug'?," Oct. 1984, 409) correctly pointed out

that Hopper's log entry is valid documentation of early usage of *bug* in a computer context, but still left readers with the impression that the moth was the source of the term. The *Annals* declined to publish my clarifying note.

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THE COMPLEMENTIZER *'CEP'FER*

Among teenagers in Toronto, and presumably in other age groups and in other locales, a new complementizer appears to be widely used. The complementizer *'cep'fer,* pronounced [sɛ́pfɚ], occurs in sentences like these:

1. I can usually put them to bed at twenty to seven, *'cep'fer* she's learning to tell time now.
2. He wasn't going to school tomorrow, *'cep'fer* he wants to know what I wrote in Caroline's yearbook, so he probably will.
3. We could go to this apartment [building], *'cep'fer* the superintendent probably wouldn't let us in.
4. We have to mail this letter, *'cep'fer* Charley might want to write something in it.
5. I had no trouble with this [tree diagram] *'cep'fer* I had three prepositional phrases in it.

The source of the new form seems clear enough. The phonology suggests an iconic reduction of *except for,* and occasionally it occurs in contexts where it is interchangeable with that form, as in (6) *Men don't usually comment on your clothes,* 'cep'fer *Dick Parker.* Grammatically, it is usually distinct from *except for,* as can be seen by attempting to substitute *except for* in sentences (1)–(5), which results in unacceptable sentences.

The homophony of *'cep'fer* in sentences like (6), where it means 'except for', and sentences (1)–(5), where it does not, suggests an extension from the former to the latter. Alternatively, in sentences (1)–(5), one can grammatically substitute *except for the fact that* for *'cep'fer* (R. Butters, personal corresondence), and *'cep'fer* may have originated as an ellipsis of the phrasal complementizer. However, the substitution of the phrasal complementizer does not work for (6), and this explanation of its origin ignores the homophony, or treats it as merely accidental.

In sentences (1)–(5), the meaning of *'cep'fer* might be expressed appropriately either by the conjunction *but* or the subordinator *although* (or *though*). Attempting to clarify the grammatical function of *'cep'fer* by relating it to either *but* or *although* is difficult because in standard use these